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Rev. 07/10/02

ROY F. WESTON, INC.

REMEDIAL INVESTIGATION REPORT
EVERGREEN MANOR SITE
ROSCOE, ILLINOIS

WESTON®
MANAGERS DESIGNERS CONSULTANTS

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28 March 2001

Mr. Mike Ribordy
Remedial Project Manager
U.S. Environmental Protection Agency
77 West Jackson Boulevard
Chicago, Illinois 60604

U.S. EPA Contract No.: 68-W7-0026
Work Assignment No.: 036-RICO-05MZ
Document Control No.: RFW036-2E-AHVH

Re: Remedial Investigation Report
Evergreen Manor Site
Roscoe, Illinois

Dear Mr. Ribordy:

Roy F. Weston. (WESTON®) is pleased to submit three copies of the Final Remedial Investigation (RI) Report for the Evergreen Manor site. If you have any questions, please contact us at (847) 918-4000.

Very truly yours,

ROY F. WESTON, INC.

Kurt T. Fischer, P.G.
Site Manager

KTF:sk

Enclosures

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REMEDIAL INVESTIGATION REPORT
EVERGREEN MANOR SITE
ROSCOE, ILLINOIS

VOLUME I

March 2001

Prepared for
U.S. Environmental Protection Agency
77 West Jackson Boulevard
Chicago, Illinois 60604

This document was prepared in accordance with U.S. EPA Contract No. 68-W7-0026, WESTON Region V Response Action Contract (RAC) and contains confidential business information.

Document Control No. RFW036-2A-AHVH

REMEDIAL INVESTIGATION REPORT
EVERGREEN MANOR SITE
ROSCOE, ILLINOIS

U.S. EPA CONTRACT NO. 68-W7-0026

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March 2001

Prepared and Approved By: Kurt Fischer, Site Manager — Date: 3/28/01

Approved By: for James M. Burton, P.E., Program Manager — Date: 3/28/01

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SECTION 1

INTRODUCTION

This Remedial Investigation (RI) report presents the results from a field investigation conducted at the Evergreen Manor site, in Roscoe, Illinois (hereafter referred to as the Evergreen Manor site). The RI field investigation was conducted by Roy F. Weston, Inc. (WESTON®) for the United States Environmental Protection Agency (U.S. EPA) from May 2000 to June 2000. This RI Report was prepared in accordance with the U.S. EPA *Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA, Interim Final* (U.S. EPA, 1988).

1.1 OBJECTIVE AND SCOPE OF REMEDIAL INVESTIGATION

In accordance with the U.S. EPA guidance document (U.S. EPA, 1988), the objective of the RI is to gather site information sufficient to support a Feasibility Study (FS) and to make an informal risk management decision regarding an appropriate remedy. The specific objectives of the RI are the following:

- **Extent of Contamination:** To evaluate the areal and vertical extent of contamination.
- **Contaminant Fate and Transport:** To determine the rate of migration and the fate of contaminants through various migration pathways.
- **Ecological Assessment:** To characterize and estimate the potential for adverse ecological effects associated with the contamination at the site.
- **Baseline Risk Assessment:** To evaluate the potential human health and environmental impacts associated with the site under a no-action alternative (i.e., in the absence of remedial action).

The RI was conducted in accordance with the *Evergreen Manor, Quality Assurance Project Plan (QAPP) and Field Sampling Plan (FSP)* (WESTON, 2000a). The main RI investigation tasks consisted of a fracture trace analysis, cone penetrometer testing (CPT), groundwater sampling, sediment sampling, surface water sampling, and monitoring well sampling.

1.2 REPORT ORGANIZATION

This RI report is divided into the following sections:

Executive Summary: Presents an overall summary of the RI Report.

Section 1, Introduction: Provides a brief overview of the objective and scope of the RI.

Section 2, Site Background: Provides the site description, site history, and a summary of results of previous site investigations.

Section 3, Environmental Setting: Describes the surrounding land use and population, climate, regional soils, surface water features, area drainage and topography, regional geology, regional hydrogeology, and groundwater use in the area.

Section 4, Environmental Investigation Procedures: Describes the procedures of the RI field investigation.

Section 5, Environmental Investigation Results: Describes the results of the RI field investigation.

Section 6, Results of Geologic/Hydrogeologic Investigations: Provides descriptions of the site geology and hydrogeology based on the results of the RI field investigation.

Section 7, Nature and Extent of Contamination: Presents the nature and extent of contamination by each medium.

Section 8, Contaminant Fate and Transport: Describes the contaminant migration pathways, environmental fate of contaminants, and rate of contaminant migration.

Section 9, Human Health Risk Assessment: Provides an evaluation of the potential threat to human health and the environment in the absence of any remedial actions.

Section 10, Ecological Assessment Summary: Provides an evaluation of the potential impacts to the ecological community from site-related contaminants.

Section 11, Conclusions and Recommendations: Presents the conclusions of the RI, identifies data gaps, and makes recommendations for additional work.

Section 12, References: Lists all reference sources used in the RI report.

The tables and figures are referenced by section numbers and are presented at the end of each section.

SECTION 2

SITE BACKGROUND

2.1 SITE DESCRIPTION

The Evergreen Manor site is located approximately 1.5 miles northwest of Roscoe, Winnebago County, Illinois. The site includes four residential subdivisions and has been defined by the extent of groundwater contamination. A site layout is provided in Figure 2-1. The site extends over Sections 16, 20, 21, 29, and 32 in Township 46 North, Range 2 East, and is found on the South Beloit, Illinois/Wisconsin Quadrangle. The coordinates of the site are latitude 42° 26' 32.0", longitude 89° 01' 36.0".

The site area was used as farmland prior to development. The Hononegah Heights subdivision was developed between 1940 and 1964; the Tresemer subdivision was developed between 1972 and 1974; the Olde Farm subdivision was developed between 1976 and 1979; and the Evergreen Manor subdivision was developed between 1986 and 1988. With the exception of the Evergreen Manor subdivision, most of the development occurred in the late 1970's and the early 1980's.

The Evergreen Manor site is bounded to the south by the Rock River. The Hononegah Forest preserve is located to the west of the site, some agricultural fields are located to the east of the site, and agricultural land is located north of the site (IEPA, 1992).

Roscoe Rock and Sand, Inc., a gravel pit and concrete mixing facility, is located approximately 0.5 miles to the northeast of the site. Roscoe Rock and Sand, Inc. purchased the former Kelley Sand and Gravel property, and is located on the north and south sides of McCurry Road, west of Route 251.

An industrial park is located approximately 2 miles to the northeast of the site and is located north of Rockton Road, and east of Route 251. The industrial park contains the following businesses: Inlander-Steindler Paper Company, Regal-Beloit Corporation, McGuire Brothers Auto Body and Sand Blasting, Makerite Manufacturing Company, Midwest-Precision Grinding, Rockford Steam Boiler Works, Oscar's Auto and Battery Clinic, Dayles Welding, Armour Specialty, Inc. (industrial painting), RD Systems, Electro Cam Corporation, Area Elevator, DGM, Preston 151 (trucking firm), and Indicon Midwest (IEPA, 1992).

Several industries are located on the south side of Rockton Road, east of Illinois Route 251. These include Ecolab and Taylor Design, Inc. Further south along and east of Illinois Route 251 are five other facilities: State Line Foundries, Waste Management Transfer Station , Kenny's Cars, Trucks and Equipment, Stateline Printing Company, and Stateline Storage. Warner Brake and Clutch is located south of McCurry Road on the east side of Route 251 (IEPA, 1992).

2.2 SITE HISTORY AND PREVIOUS REPORTS

The Evergreen Manor site was first realized in November 1990 when a lending institution required a homeowner to sample and analyze the drinking water. Results of the analyses indicated elevated concentrations of volatile organic compounds (VOCs). The Illinois Department of Public Health (IDPH) undertook further sampling in the area and identified a plume of contamination located beneath the Hononegah Heights and Evergreen Manor subdivisions (IEPA, 1992).

The results of the IDPH sampling indicated that maximum concentration limits (MCLs) were exceeded for trichloroethene (TCE; MCL of 5 ppb), and 1,1-dichloroethene (1,1-DCE; MCL of 7 ppb) in one or more wells. Other VOCs identified included cis-1,2-dichloroethene (c-1,2-DCE), 1,1-dichloroethane (1,1-DCA), 1,1,1-trichloroethane (1,1,1-TCA), tetrachloroethane (PCE), and 1,1,2-trichloroethane (1,1,2-TCA). Based on these results, the IDPH concluded that at least 130

residences in the Hononegah, Olde Farm, Evergreen Manor, and possibly the Tresemer subdivisions could be contaminated with VOCs (IEPA, 1992).

The Evergreen Manor site was added to the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) on 3 August 1991, based on information received by the Illinois Environmental Protection Agency (IEPA) from the IDPH and the U.S. Environmental Protection Agency (U.S. EPA). The first Comprehensive Environmental Response and Liability Act (CERCLA) evaluation was a Preliminary Assessment (PA) of the Evergreen Manor site in January 1992.

CERCLA Screening Site Inspection Report, 1992

A Site Screening Inspection (SSI) was performed in June and August 1992 to gather information for potential Hazard Ranking. A total of 39 soil gas samples and 4 groundwater samples were collected and analyzed for 1,1,1-TCA, TCE, and 1,1-DCE. Soil gas samples collected along McCurry Road, east of IL Route 251, and along the frontage road east of IL Route 251 indicated the presence of the three VOCs. The compounds were not detected on the north side of the Ecolab facility, nor along the north side of Rockton Road.

The results of the groundwater analyses indicated that the VOCs were not detected in the samples collected on the north side of the Ecolab facility, or along the frontage road. The three VOCs were detected in a well north of the Waste Management facility.

The SSI Report assigned a high priority to the Evergreen Manor site based on the results of the SSI and the groundwater samples collected from residential wells by IDPH between 1990 and December 1991.

CERCLA Expanded Site Inspection Report,1999

The Expanded Site Inspection (ESI) was conducted in November 1993 and consisted of the collection of 49 groundwater samples from residential wells. The residential wells sampled are located in the Hononegah Heights, Olde Farm, and Evergreen Manor subdivisions. The purpose of the ESI was to collect information in support of the Hazard Ranking System package preparation.

A total of 49 groundwater samples were collected from 45 residences in the three subdivisions, four of which were duplicate samples. The samples were analyzed for VOCs. Results indicated that in all but one of the samples, and excluding two background samples, at least one VOC was detected. Acetone, 1,1-DCE, 1,1-DCA, 1,2-DCE (total), and PCE were detected at concentrations less than the laboratory detection limits. 1,1,1-TCA and TCE were detected at concentrations of less than 10 ppb to 37 and 40 ppb, respectively. Of the 45 wells sampled, 36 were found to have 1,1,1-TCA concentrations significantly above background, and 40 were found to have TCE concentrations significantly above background. All 40 TCE detections were at concentrations greater than the MCL.

Additionally, this report indicated that results of residential well sampling by IEPA in December 1993 and January 1994 found more than 60 residential wells with concentrations of 1,1,1-TCA and/or TCE above either the MCLs or the Cancer Risk.

Hazard Ranking System Documentation Record, 29 May 1997

Based on the information and data gathered from the PA, the SSI, the ESI, and other sampling by IEPA and/or IDPH, a Hazard Ranking System (HRS) score was prepared. The Evergreen Manor Ground Water Contamination Plume, ILD 984836734, received a score of 100 points, for the groundwater pathway. The air, soil, and surface water pathways were not evaluated. The final HRS site score was 50 points.

Engineering Evaluation/Cost Analysis Report, October 1998

The Engineering Evaluation/Cost Analysis Report (EE/CA) was written with the objective of evaluating removal action objectives and removal action alternatives. Three viable alternatives were identified which would abate the threat posed by drinking the groundwater. These included a point-of-entry carbon filter treatment option, a point-of-use carbon filter treatment option, and an option to connect the affected residences to a public water supply system.

The EE/CA also summarized work that has occurred at the Evergreen Manor site outside of the scope of the PA, SSI, and ESI:

- IEPA and IDPH sampled 267 drinking water wells, mostly in the four subdivisions, between December 1990 and March 1994. Results indicated that 108 wells exceeded MCLs and 203 were impacted.
- IEPA installed 24 monitoring wells between December 1993 and February 1995. Sample results from March 1994 indicated that 2 out of 20 wells exceeded MCLs for TCE and PCE. Sample results from February 1995 indicated that 3 out of 24 wells exceeded MCLs for TCE and four exceeded for PCE.
- Sample results from 12 wells sampled by U.S. EPA on 22 May 1998 indicated that six wells exceeded the MCLs for TCE and three wells exceeded the MCLs for PCE.

Action Memorandum, 2 March 1999

This Action Memorandum served as a request for a non-time critical CERCLA removal action and consistency exemption to the $2 million and 12 month statutory limit at the Evergreen Manor site. The U.S. EPA recommended the extension of the public water supply system in order to provide the affected residences with safe drinking water. This decision was based on the permanence of the solution and the public response to the EE/CA during the public comment period, which opened on 10 November 1998.

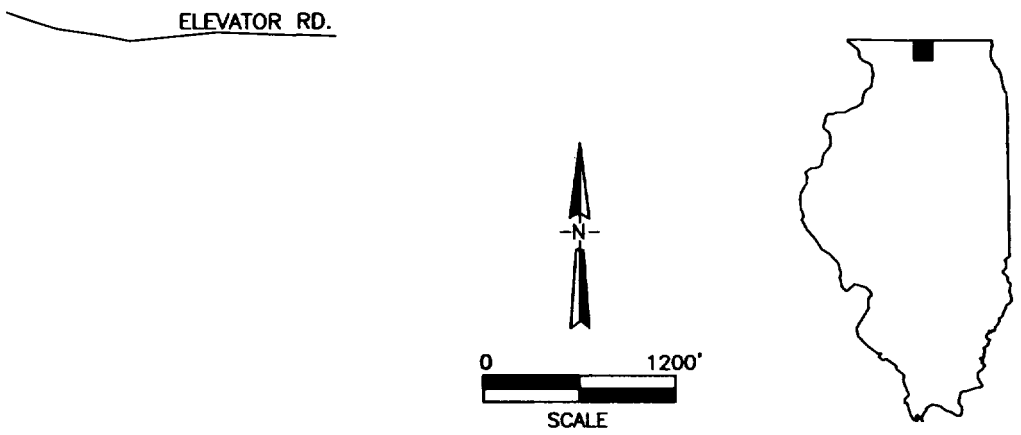
The Evergreen Manor site contamination was estimated to affect 700 people in approximately 250 residences. A preliminary risk assessment indicated that the continued usage of residential wells would pose a threat to public health and the environment. Since the concentrations of TCE and PCE exceed MCLs, this condition represented an imminent and substantial endangerment to local residents.

The source area was identified in the Action Memorandum as the area at the intersection of Rockton Road and Route 251.

Administrative Order on Consent, 14 May 1999

U.S. EPA entered into an administrative order on consent (AOC) with three PRPs concerning the Evergreen Manor Groundwater Contamination Site. The AOC requires the PRPs to pay a total of $2,100,850 to partially fund the removal action to be performed by U.S. EPA. The removal action will consist of construction of a water main extension to bring potable water from the North Park Public Water District to the individual residences threatened by contaminated water.

Work related to the extension of the public water supply system and hookup of the effected residences commenced in 1999, and was completed on September 29, 2000.



NOTE:
BASEMAP ADAPTED FROM FIGURE 1 OF THE CONTAMINANT SOURCE EVALUATION – EVERGREEN MANOR SITE, DATED JANUARY 1997, BY CONESTOGA–ROVERS & ASSOCIATES.

FIGURE 2–1

HERNANDD–03/26/01–14:11–J:\CAD93\300\32499

DESIGNERS/CONSULTANTS

750 E. Bunker Ct.
Suite 500
Vernon Hills, Illinois
60061

SITE LAYOUT

EVERGREEN MANOR SITE
Roscoe, Illinois

SECTION 3

ENVIRONMENTAL SETTING

3.1 DEMOGRAPHY AND LAND USE

The Evergreen Manor site in Roscoe, Winnebago County, Illinois includes four residential subdivisions and has been defined by the extent of groundwater contamination. A site layout is provided in Figure 2-1. According to the 1990 U.S. Census, the Evergreen Manor site is in Census Tract 003902, Block Group 2, and has a total population of 3,632, 3% of whom are minorities. The Evergreen Manor contamination has the potential for affecting 243 homes and an estimated population of approximately 700 persons (IDPH, 1999).

Land use in and around the site is residential, agricultural, commercial and industrial. The land from Hononegah Road to the Rock River is residential. Directly north of Hononegah Road, is commercial property with various stores in a strip mall. Between the strip mall and Rockton Road, on the west side of Illinois Route 251, most of the land is agricultural and is actively used during the growing season. This area also includes an area of heavy industrial land use: a sand and gravel quarry and cement mixing facility. To the east of Illinois Route 251, from Hononegah Road to Rockton Road, land use is mixed between commercial, light industrial and residential. This area includes the Ecolab facility, the Waste Management Transfer Station, Kenny's Cars, Trucks, and Equipment, as well as other companies. In the northeast quadrant of Illinois Route 251 and Rockton Road most of the land is light industrial and is occupied by the industrial park. Section 2.1 lists all of the industries and businesses in the site area.

3.2 CLIMATE

Winnebago County has a continental climate typical of northern Illinois. This area has hot summers and cold winters, with July being the hottest month and January being the coldest. The average temperature in winter is 23°F and in summer is 71°F. The lowest recorded temperature was -22 °F recorded on 21 January, 1970. The highest recorded temperature was 103 °F recorded on 27 July, 1955. Annual precipitation averages 38 inches and annual snowfall averages 33 inches. Sixty-six percent of the rainfall occurs between the months of April through September.

3.3 ECOLOGY

The site is located in the Central Lowland geomorphic province, in the eastern broadleaf forest province of the Hot Continental Division in the Humid Temperate Domain (USDA Forest Service, Ecological Subregions of the United States, http://www.fs.fed.us/land/pubs/ecoregions).

The Rock River receives drainage from three major streams - the Pecatonica River, the Kishwaukee River, and the Green River. It is 163 miles long in Illinois, and drains 2,272,000 acres in Illinois. Of the total river miles in this basin, 69 stream miles have "good" overall resource quality and 97.9 miles have "fair" quality. The Rock River enters the Mississippi River at Rock Island (IDNR, http://dnr.state.il.us/lands/education/valerie/end/page6.htm). At Rockton, the mean daily discharge ranges from 2839 cubic feet per second (cfs) in September to 7375 cfs in April, with an annual mean of 4178 cfs (USGS, CD-ROM, Current Year Discharge, http://www.il.water.usgs.gov/cd04-99/dis_tbl/05437500.htm). Dry Creek, a tributary of the Rock River, enters the river northwest of the Tresemer Subdivision. West of Dry Creek, the river is classified by the NWI as a riverine wetland and east of the creek, the river is classified as a lacustrine system. Forested wetlands border both the river and the creek west of the site and the river south of the site. There are small areas of emergent wetlands within the Evergreen Manor subdivision.

The U.S. Fish and Wildlife Service (USFWS) was contacted to obtain information on threatened and endangered species within the Evergreen Manor project area. Species that may be present in the area include the endangered Indiana bat (*Myotis sodalis*), the threatened prairie bush clover (*Lespedeza leptostachya*), the threatened bald eagle (*Haliaeetus leucocephalus*). Further information on these species and their critical habitat is provided in Appendix A.

3.4 REGIONAL TOPOGRAPHY

The topography in Winnebago County has been created in large part by features developed during the advance and retreat of glaciers. This includes till plains that contain kames, drumlins, and eskers (USDA-NRCS, 1980). The Evergreen Manor site is located on a broad, flat terrace, which gently slopes toward the Rock River. Locally, relief is no greater than about 70 feet from the highest area near Rockton Road and IL Route 251, down to the Rock River elevation of approximately 700 feet above Mean Sea Level (MSL).

3.5 REGIONAL GEOLOGY

The geology in the vicinity of the Evergreen Manor site has been most heavily influenced by fluvial and glacial processes. The preglacial Rock River incised a deep bedrock valley that was subsequently buried during glaciation. As the glacier retreated, vast deposits of sand and gravel with lesser amounts of silt and clay were deposited in the river valley. The Evergreen Manor site is located in the preglacial Rock River buried valley.

Overburden Geology

The surficial geology in the vicinity of the Evergreen Manor site consists of windblown sand and silt, lacustrine sand, silts and clays, and outwash sand and gravel deposited within the preglacial Rock River valley. Till deposits are found primarily along the valley margins. The valley was

primarily filled with deposits from the Quaternary Period, during the Illinoian and Wisconsinan glacial events. The sand and gravel deposits are the most abundant and most extensive deposits in the buried valley, and can reach a thickness of up to 300 ft. in the vicinity of the Evergreen Manor site (IDENR, 1960).

Bedrock Geology

The bedrock geology in the vicinity of the Evergreen Manor site is characterized by the Ordovician and Cambrian clastic and carbonate rocks. The Galena and Platteville dolomite, and the Ancell Groups represent the Ordovician Period in this area. The Ancell Group consists of two formations: the Glenwood, which is a sandy shale, and the St. Peter, which is predominantly a well-sorted sandstone up to 400 ft thick. The ancient Rock River eroded the Galena and Platteville dolomite, and the Glenwood, and carved its valley into the St. Peter sandstone (Colten, 1986).

The Cambrian rocks are dominated by sandstones with lesser thicknesses of shale and dolomite. The Potosi (dolomite) and Franconia (sandy shale) Formations separate the Ironton-Galesville sandstone from the Ordovician rocks. The Ironton-Galesville sandstone has a thickness of up to 170 ft. The Eau Claire Formation is up to 450 ft thick, and the Mt. Simon sandstone can be up to 1600 ft thick.

The sedimentary bedrock units in the vicinity of the Evergreen Manor site were deposited on an irregular surface of metamorphic and igneous Precambrian rocks. Beneath the site, the Precambrian consists of a granite (Colten, 1986).

3.6 SOILS

The predominant surficial soil type mapped for the site and surrounding area is the Warsaw loam (USDA-NRCS, 1980).

The Warsaw loam is a nearly level to gently sloping soil found on terraces, convex ridges, outwash plains, gravelly kames and stream terraces. Depending on the slope, the surface layer is about 10 to 12 inches thick and consists of a very dark gray to a very dark brown loam. The subsoil is from about 24 to 41 inches thick and consists of loam to gravelly loam and varies in color from dark grayish brown to brown to dark reddish brown. The substratum, to a depth of about 60 inches, consists of yellowish brown, calcareous sand and gravel. The permeability of the Warsaw loam is moderate to rapid, with moderate water capacity, and moderate organic matter content (USDA-NRCS, 1980).

Other soil types exist within the site area. Soil types located near the Rock River and Dry Creek are characterized by higher clay contents and moderate permeabilities. Other soil types, further from the water ways, are characterized by higher sand or sand and gravel contents and rapid permeability (USDA-NRCS, 1980).

3.7 REGIONAL HYDROGEOLOGY

The sand and gravel deposits have significant permeability and transmissivity and are the predominant local water source in the vicinity of the preglacial valley.

Hydrogeology

The unconsolidated outwash sand and gravel, the St. Peter, Ironton-Galesville, and Mt. Simon Formation sandstones are the aquifers underlying the site. The outwash sands and gravels have significant permeability and transmissivity and are the predominant local water source for private residences in the vicinity of the preglacial Rock River Valley. Larger wells owned or used by municipalities or developments draw groundwater from the bedrock aquifers.

The outwash sand and gravel is an unconfined aquifer with more uniform (i.e. better sorted) deposits at depth. Hydraulic conductivity in the outwash deposits has been estimated at $1x10^{-3}$ cm/sec (IEPA, 1997). According to well logs, most of the private residential water wells are finished in the outwash sand and gravel deposits at depths of 50 to 80 ft below ground surface (bgs). The water table is approximately 35 ft bgs (U.S. EPA, 1999a).

The Galena and Platteville dolomite is an aquitard with a hydraulic conductivity estimated to range from $1x10^{-8}$ to $1x10^{-11}$ cm/sec (IEPA, 1997). Flow in the dolomite is through vertically oriented fracture and joint systems. Although not used for high yield production wells the Galena and Platteville dolomite is used for small-demand, rural domestic and livestock water supply (Colten, 1986).

The Glenwood Formation, consisting of shale overlying a poorly sorted sandstone, has an estimated hydraulic conductivity of $1x10^{-4}$ to $1x10^{-7}$ cm/sec (IEPA, 1997).

The St. Peter sandstone underlies the Galena and Platteville, and Glenwood Formations, except along the axis of the Rock River buried valley, where the overlying bedrock has been removed by erosion. The St. Peter sandstone has an estimated hydraulic conductivity of $1x10^{-4}$ cm/sec and is widely used as a water source in Winnebago County (IEPA, 1997).

The Ironton-Galesville Formation sandstone is a confined unit and a very productive aquifer. However, due to its depth, few wells are finished in the Ironton-Galesville Formation (Colten, 1986). The same holds true for the Mt. Simon sandstone, which can reach a thickness of 1600 ft, and overlies the Precambrian granite.

3.8 REGIONAL SURFACE WATER HYDROLOGY

The Evergreen Manor site lies in the Lower Rock River drainage basin. The Rock River orginates in Wisconsin and enters Illinois south of Beloit. In Illinois, the Rock flows in a southwesterly direction to its confluence with the Mississippi at Rock Island. In the vicinity of the site, the Rock River flows generally in a north to south direction. The only tributary to the Rock on the site is Dry Creek, which flows from the northeast to the southwest and discharges into the Rock in the Hononegah Forest Preserve. Two lakes, Pearl Lake and Victoria Lake, are located north of the site, west of Illinois Route 251. These lakes are former sand and gravel quarries.

3.9 GROUNDWATER USE IN THE AREA

The City of Roscoe is part of the North Park Public Water District (NPPWD), however, not all residences receive their water from this source. At the time of this writing, most of the residential wells within the Evergreen Manor site plume have been abandoned and these residences have been connected to the public water supply. However, private wells are still in use on either side of the plume and draw groundwater from the shallow sand and gravel aquifer. Two municipal wells providing a portion of the water to the NPPWD are located at the corner of Hononegah Road and Cedar Brook Road. These wells draw water from a depth of 750 feet below grade from the St. Peter Sandstone (IEPA, 1997).

SECTION 4

ENVIRONMENTAL INVESTIGATION PROCEDURES

This section describes the procedures used during the field investigation. The field investigation was conducted between 10 May 2000 and 7 June 2000 and consisted of the following activities:

- Fracture Trace Analysis
- CPT Groundwater Sampling
- Monitoring Well Sampling
- Residential Well Sampling
- Sediment Sampling
- Surface Water Sampling
- Groundwater Elevation Measurements
- Ecological Investigation

Prior to starting field activities, a site-specific Health and Safety Plan (HASP) (WESTON, 2000C), and a QAPP/FSP (WESTON, 2000a) were prepared. The HASP describes the safety protocols for field activities. The HASP was prepared in accordance with the Occupational Safety and Health Administration (OSHA) requirements as outlined in 29 CFR 1910 and other applicable requirements. The QAPP/FSP presents the organization, objectives, functional activities, and specific Quality Assurance and Quality Control (QA/QC) activities associated with the field activities. The QAPP/FSP also describes the specific protocols for sampling, sample handling and storage, chain of custody, and laboratory and field analysis. The QAPP/FSP was prepared in accordance with U.S. EPA QAPP guidance documents; in particular, the *Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans* (QAMS-005/80) (U.S. EPA, 1980), *Region V Content Requirements for QAPPs* (U.S. EPA, 1989b), and the *Region V Model QAPP* (U.S. EPA, 1991d).

The laboratory analysis was performed by four different laboratories. On-site VOC analysis of soil and water samples was performed by Lockheed Martin Services Group, Environmental Services & Technologies Region 5 (ESAT), of Chicago, Illinois. Off-site VOC analysis of water samples was

performed by Mitkem Corporation, of Warwick, Rhode Island (MITKEM). Off-site VOC analysis of soil samples was performed by Datachem Laboratories of Salt Lake City, Utah (DATACHEM). Off-site water quality parameters analyses were performed by Chemtech, of Edison, New Jersey (CHEMTECH).

4.1 FRACTURE TRACE ANALYSIS

A fracture trace analysis was performed in order to better identify potential source areas, potential locations for CPT work, and to obtain a better understanding of the flow system. Resolution Resources, Inc. (RRI), of Minneapolis, Minnesota and Warrenton, Virginia were contracted to perform this study. RRI used aerial photographs dating back to 1939 in order to identify linear features in the overburden (lineaments), that may have been caused by fractures in the underlying bedrock. This information was used to target potential preferential flow pathways for subsequent groundwater profile sampling and analysis. A complete discussion of this approach is presented in RRI's report, which is included in Appendix B.

4.2 CONE PENETROMETER TESTING (CPT)

A 20 ton, truck-mounted cone penetrometer rig was used to perform cone penetrometer testing (CPT), and groundwater sampling between 25 May and 6 June 2000. The purpose of CPT was to identify the stratigraphy at various locations across the site, and then use that information to choose groundwater sampling depth intervals at each location. Of the 13 locations identified with "CPT", on Figure 4-1, stratigraphy testing was performed at 10 of them.

The stratigraphy at each CPT location was analyzed by hydraulically pushing a 2-inch diameter, instrumented probe into the subsurface and recording geotechnical data. This included end-bearing resistance, friction along the sides of the probe, and electrical conductivity. End bearing resistance, measured in tons per square foot (tsf), helps differentiate between different geologic materials. For

instance, sand has a greater end bearing resistance than a clay. Similarly, the amount of friction along the sides of the probe helps identify the type of geologic material. Lower friction is incurred when pushing the probe through a sand than when pushing the probe through a clay, silty clay, or silt. The ratio of friction to end bearing resistance (friction ratio) is a measure that helps identify the amount of fine grained material (clay and silt) present. As an example, when pushing through a predominantly silty sand, both the end bearing resistance and the friction ratio will be high.

The electrical conductivity measure was used because of its ability to identify features such as the water table, groundwater plumes, and clay lenses. Zones that are unsaturated, or saturated with non-conductive liquids, will give low electrical conductivity readings; saturated zones will give significantly higher readings. This measure is also useful in identifying dissolved constituents in groundwater plumes, however, this was not an expectation at the Evergreen Manor site.

CPT was conducted at locations CPT01 through CPT08, CPT11, and CPT13. As described in the Field Sampling Plan, because of the expected similarity in stratigraphy across the site, CPT was not intended to be conducted at each location. Therefore, CPT was not conducted at CPT09, CPT10, and CPT12.

The expectation was to advance CPT holes to a depth of about 120 feet below grade, however, the abundance of gravels and cobbles limited the depth of penetration. In most instances, the CPT holes were advanced to at least 90 feet below grade. However, at CPT07, CPT08, and CPT13, refusal was encountered at depths less than 10 to 15 feet below grade. It was noted that a concrete-containing fill may be present in this area, which could cause refusal of the CPT probe. It is also possible that natural features (cobbles and/or boulders) were responsible for the refusals. Several attempts were made to penetrate deeper at each of these locations without success.

4.3 CPT GROUNDWATER SAMPLING

Groundwater samples were collected between 25 May and 6 June 2000. In general, groundwater samples were collected directly after completion of the CPT hole (stratigraphy hole). Based on the stratigraphy, sampling intervals were chosen. The groundwater sampling locations were typically within several feet of the stratigraphy hole locations. In the same manner that the CPT rods were pushed, the groundwater sampler was advanced by hydraulically pushing it to the pre-determined depth. The groundwater sampler consisted of a screen with a retractable outer casing. The screen was opened by pulling back on the rods, exposing the screen to the native soil and groundwater.

At CPT-01, the groundwater sampler was first pushed to the deepest location to collect a groundwater sample. The sampler was then pulled back to the next shallower depth to collect another sample. This was repeated until the shallowest sample was collected. Difficulties were encountered while attempting to purge the rod string of water. Because of the inefficiency of purging the rod string, this approach was changed for all subsequent CPT groundwater samples; instead of this bottom-up approach, it was changed to a top-down approach.

For locations CPT-02 through CPT-13, the groundwater sampler was first pushed to the shallowest depth interval to collect a sample. The entire rod string was then pulled out, decontaminated, and re-deployed into the same hole to the next sampling interval. In some instances, only a stratigraphy hole and one other hole were pushed. However, at CPT-03 the sampling hole was reamed out in the vadose zone, from multiple deployments through the same hole, to the point where the hole did not provide enough lateral support to the rod string. The result was that the rod string broke just below the water table in CPT-03. Subsequently, several sampling holes were typically pushed at each location.

At each sampling depth the groundwater sampler was opened, and small diameter tubing, with a check valve at the bottom was lowered through the CPT rods. Groundwater was pumped from the

tubing in conjunction with a peristaltic pump, however, groundwater could not be pumped to the surface due to the depth of the water table. To collect the groundwater samples, the tubing was pulled from the rod string and evacuated using the peristaltic pump. At the time of sampling, measurements of pH, specific conductance, temperature, turbidity, DO, ORP, and Fe^{+2} were recorded on *Water Sample Collection Forms*, which are presented in Appendix C. Care was taken to fill the 40 mL VOA vials at an angle to minimize splashing and bubbling, and to ensure that they were closed with no headspace. All of the samples collected were analyzed for VOCs.

4.4 MONITORING WELL SAMPLING

A total of 15 existing monitoring wells, shown on Figure 4-1, were sampled from 30 May through 2 June 2000. **Note:** The monitoring wells are identified with a prefix of 'G' (e.g. G103D) on the figures, which was the designation given by the IEPA at installation time. However, they are referred to throughout the text with the prefix 'MW' (e.g. MW103D), which corresponds to the designated sample numbering system in the approved QAPP.

Each sample collected from the monitoring wells were analyzed for VOCs and Fe^{+2} (in the field). Additional volume was collected from the deep well at each cluster and from non-clustered wells for water quality parameter analysis. Water quality parameters were analyzed to aid in evaluating the potential for biodegradation of the chlorinated hydrocarbon plume. Water quality parameters include: ammonia, chemical oxygen demand (COD), nitrate, nitrite, orthophosphate, sulfate, sulfide, and ferrous iron (Fe^{2+}; measured in the field).

Each monitoring well, with the exception of MW-112, was purged and sampled using a decontaminated Grundfos™ pump and tubing. Monitoring well MW-112 was found to be bent and the pump could not fit down the stainless steel riser. A disposable bailer was cut to a length of 7 inches in order to fit past the bent riser, and was used to purge and sample MW-112. The depth to water in the well and the total depth of the well were measured with an electrical sounding device.

The top of the inner well casing was used as the reference point for these measurements. These measurements were used to calculate well volume and were recorded, along with the time, on *Water Sample Collection Forms*, which are presented in Appendix C. A minimum of three purge volumes was removed from the wells. After removing the third well volume, field measurements of pH, specific conductance, temperature, and turbidity were recorded.

Purging continued until the measurements for all parameters had stabilized (±0.25 units for pH, ±10 percent for specific conductance, ±1.0 C, and ±10 percent for turbidity) for two consecutive rounds of readings or until five well volumes had been purged. Measurements of dissolved oxygen (DO), and oxygen reduction potential (ORP) were recorded, but were not used to determine stabilization. A Hach Test Kit (Model IR-18C) was used to measure Fe^{+2} and samples were collected once the well had stabilized. Sample containers (40 mL VOA vials and three 1 L plastic bottles) were filled directly from the pump tubing. Care was taken to fill the VOA vials at an angle to minimize splashing and bubbling, and to ensure that they were closed with no headspace.

4.5 RESIDENTIAL WELL SAMPLING

A total of 22 residential wells, shown on Figure 4-2, were sampled between 31 May and 6 June 2000. All of the samples collected were analyzed for VOCs and one water quality parameter (Fe^{+2}). Six of the 22 samples were additionally analyzed for the following water quality parameters: ammonia, COD, nitrate, nitrite, orthophosphate, sulfate, and sulfide. Water quality parameters were analyzed to aid in evaluating the potential for biodegradation of the chlorinated hydrocarbon plume.

Each residential well was sampled at an outside cold-water spigot. To purge each residential well, water was allowed to flow for at least 20 minutes. After the 20 minutes, field measurements of pH, specific conductance, temperature, and turbidity were recorded. Purging continued until two consecutive rounds of parameter measurements had stabilized (±0.25 units for pH, ±10 percent for specific conductance, ±1.0 C, and ±10 percent for turbidity). DO and ORP measurements were

taken, however, they were not used to determine stabilization. All measurements were recorded on *Water Sample Collection Forms*, which are presented in Appendix C.

A Hach Test Kit (Model IR-18C) was used to measure Fe^{+2} and samples were collected once the well had stabilized. Sample containers, 40 mL VOA vials and three 1 L plastic bottles glass (as applicable for water quality parameters), were filled directly from the spigot, by first filling the VOA vials, and then the plastic bottles. Care was taken to fill the VOA vials at an angle to minimize splashing and bubbling, and to ensure that no headspace remained once a vial was capped.

4.6 SEDIMENT SAMPLING

A total of 6 sediment samples and one QC field duplicate were collected from Dry Creek and the Rock River on 23 and 24 May 2000, at locations shown on Figure 4-3. The sediment samples were collected to determine if site contaminants were present in river sediments. Three sediment samples (SD-01 to SD-03) were collected at regular intervals along the eastern bank of the Rock River. SD-01 was an upriver location. SD-02 was upriver of where the plume was believed to discharge to the Rock River, but downgradient of the confluence with Dry Creek. SD-03 was adjacent to the site. The other three sediment samples (SD-04 to SD-06) were collected from Dry Creek. SD-04 was an upgradient location. SD-05 and SD-06 were collected from locations within and downstream of the site.

The sediment samples were collected by shoveling sediment from the river or creek and then placing the sediment in a 16-ounce glass jar using a sterilized plastic scoop. Sediment sampling was conducted from downriver to upriver locations, to minimize the impact of sediment disturbance and/or cross contamination of samples. All reusable field sampling equipment used for sediment sampling was decontaminated between sample locations. The six investigative sediment samples and a QC duplicate were submitted to the mobile ESAT laboratory for VOC analysis and to CHEMTEC for Total Organic Carbon (TOC) analysis. One sample (SD04-01) and its QC duplicate

(SD04-01) were shipped to DATACHEM for confirmation VOC analysis. The analytical results of the sediment sampling are presented in Subsection 5.5.

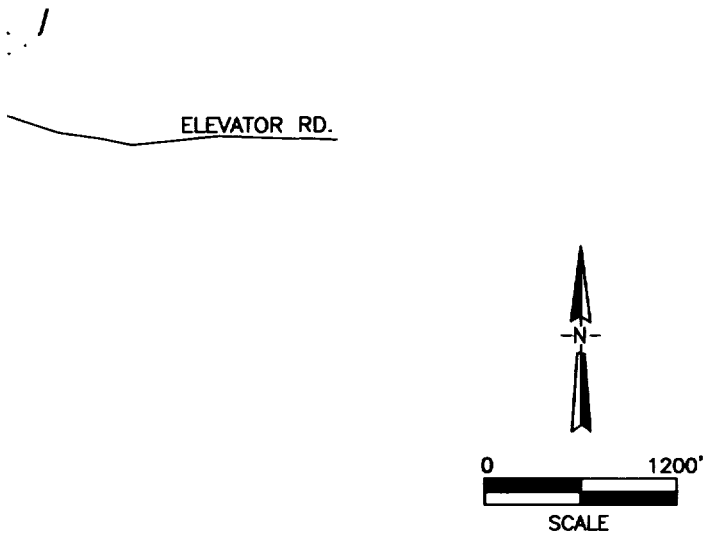
4.7 SURFACE WATER SAMPLING

A total of six surface water samples (SW01-SW06) were collected from Dry Creek and the Rock River on 23 and 24 May 2000, as shown on Figure 4-3. The surface water samples were collected to determine if site contaminants were migrating into Dry Creek and the Rock River. Surface water samples were collected at approximately the same locations as sediment samples. At all six locations, surface water samples were collected prior to collection of sediment samples. Surface water samples were collected from the bank directly into pre-preserved 40 mL VOA vials. The sampling progressed from downstream to upstream locations to minimize the impact of sediment disturbance and/or cross contamination of samples.

The six samples and one QC duplicate sample were submitted to the mobile ESAT laboratory for VOC analysis. One sample (SW04-01) and its QC duplicate (SW04-01DP) were submitted to MITKEM for confirmation VOC analysis. The analytical results of the surface water sampling are presented in Subsection 5.6.

4.8 GROUNDWATER ELEVATION MEASUREMENTS

Depth to groundwater and depth to bottom were measured at 16 monitoring wells, on 6 June 2000, over a period of about 1.5 hours. An electrical sounding device (Solinst water level indicator) was used to measure the depth to water and the total depth of each well. The top of the inner well casing was used as the reference point for these measurements. Although bent, the top of the well casing at MW-112 was still used as a reference point. This should impart an error of only several tenths of a foot and since it is the furthest upgradient well location, the data is deemed usable.



HERNANDD-03/26/01-14:21-J:\CAD93\200\23300

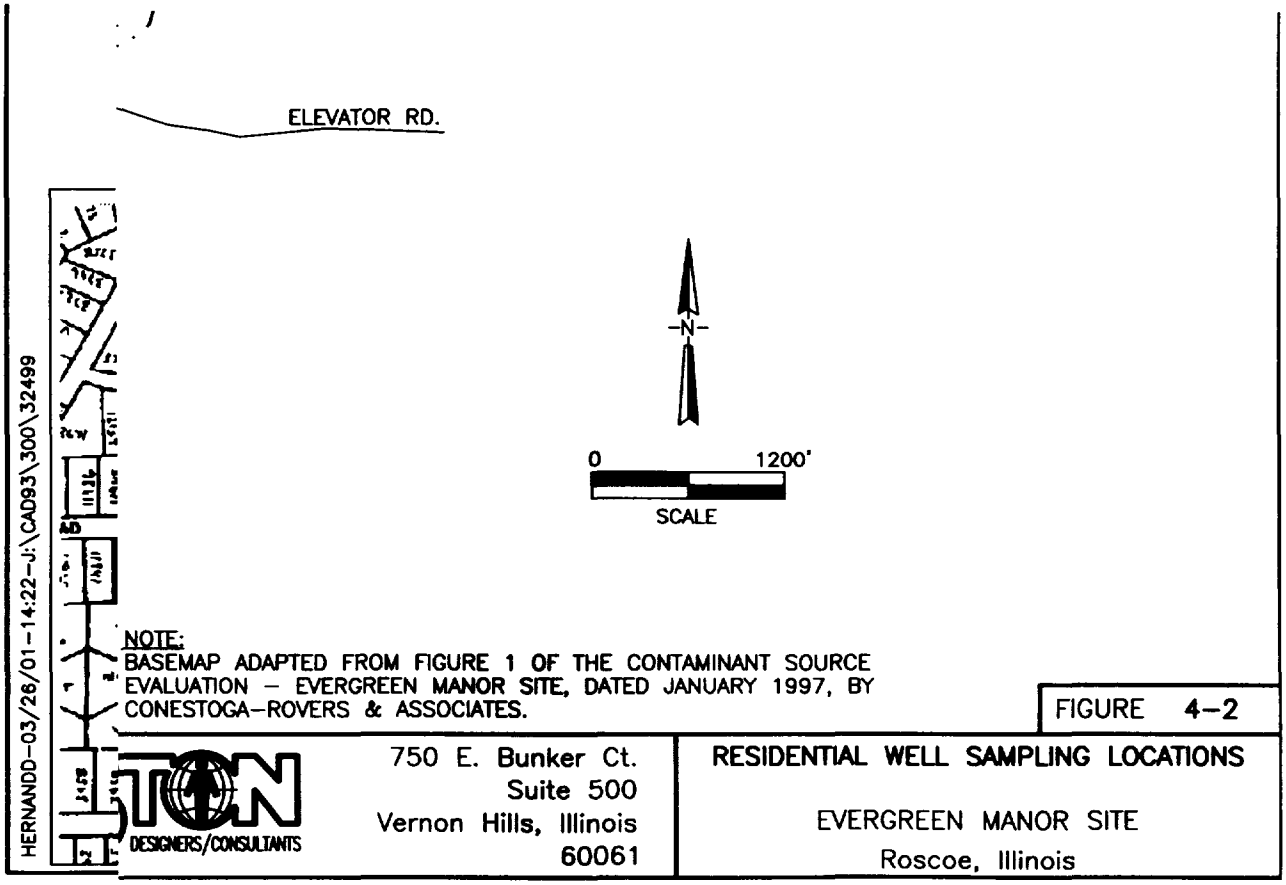
NOTE:
BASEMAP ADAPTED FROM FIGURE 1 OF THE CONTAMINANT SOURCE EVALUATION – EVERGREEN MANOR SITE, DATED JANUARY 1997, BY CONESTOGA–ROVERS & ASSOCIATES.

FIGURE 4–1

DESIGNERS/CONSULTANTS

750 E. Bunker Ct.
Suite 500
Vernon Hills, Illinois
60061

GROUNDWATER SAMPLING LOCATIONS
(CPT AND MONITORING WELLS)
EVERGREEN MANOR SITE
Roscoe, Illinois



NOTE:
BASEMAP ADAPTED FROM FIGURE 1 OF THE CONTAMINANT SOURCE EVALUATION – EVERGREEN MANOR SITE, DATED JANUARY 1997, BY CONESTOGA-ROVERS & ASSOCIATES.

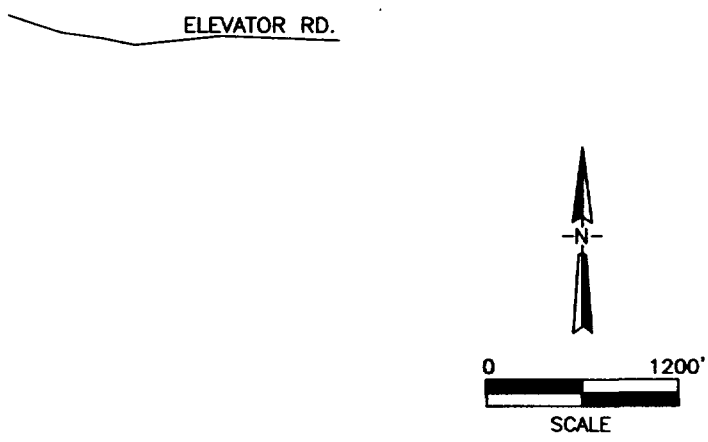
FIGURE 4-2

TN DESIGNERS/CONSULTANTS

750 E. Bunker Ct.
Suite 500
Vernon Hills, Illinois
60061

RESIDENTIAL WELL SAMPLING LOCATIONS

EVERGREEN MANOR SITE
Roscoe, Illinois



NOTE:
BASEMAP ADAPTED FROM FIGURE 1 OF THE CONTAMINANT SOURCE EVALUATION – EVERGREEN MANOR SITE, DATED JANUARY 1997, BY CONESTOGA–ROVERS & ASSOCIATES.

FIGURE 4–3

HERNANDD–03/26/01–14:24–J:\CAD93\300\32499

TCN DESIGNERS/CONSULTANTS

750 E. Bunker Ct.
Suite 500
Vernon Hills, Illinois
60061

SEDIMENT AND SURFACE WATER SAMPLING LOCATIONS
EVERGREEN MANOR SITE
Roscoe, Illinois

SECTION 5

ENVIRONMENTAL INVESTIGATION RESULTS

This section presents results of data collected during the various environmental investigations. The investigations included a fracture trace analysis, CPT groundwater sampling, monitoring well sampling, residential well sampling, sediment sampling, surface water sampling, groundwater elevation measurements, and ecological investigation.

5.1 FRACTURE TRACE ANALYSIS

The fracture trace analysis was completed by RRI according to the procedures outlined in Subsection 4.1. RRI analyzed a number of aerial photographs and photo pairs in order to identify lineaments in the overburden, which could indicate the presence of underlying faults. The report by RRI is included in Appendix B. The following summarizes the findings of the fracture trace analysis.

The fracture trace analysis identified two main sets of fracture trends: a north-south/east-west set, and a northeast-northwest conjugate set. To the north of Hononegah Road, the predominant set of fractures is the northeast-northwest set, and to the south of Hononegah Road, the predominant set of fractures is the north-south/east-west set. This information supports the pre-RI plume location (shown on Figure 4-1), derived from previous investigations, and also indicates that a predominant flow path (or direction) may exist. Thus, the flow may be influenced by fractures propagated into the overburden from the underlying bedrock.

RRI also indicated, that based on the predominant fracture set directions, a possible source area could be identified as the industrial park near the intersection of Route 251 and Rockton Road. They also identified another potential source, which is a former farm located near Hononegah Road and upgradient of the residential area of the site.

Based on the fracture trace analysis, RRI suggested over 40 points located along fractures, or at fracture junctions, where CPT groundwater sampling could be done in order to better delineate the plume, or identify a source area. As a result of this recommendation, all the CPT locations along McCurry Road were adjusted to coincide with identified fracture locations, and two additional locations (CPT 1 and CPT 2) were completed along Route 251 near the potential source area.

5.2 CPT GROUNDWATER SAMPLING

CPT groundwater samples were collected at 10 locations. At each of these locations a sample was collected from a minimum seven different sampling depths. At two of the locations, samples were collected from eight depths. Each sample was analyzed for VOCs by the on-site laboratory (ESAT) as well as for Fe^{+2}, which was measured in the field at the time the sample was collected. Other field parameters included temperature, pH, specific conductance, turbidity, dissolved oxygen, and oxidation-reduction potential.

A total of 72 CPT groundwater samples were collected. Additionally, six QC duplicate samples were analyzed on site by ESAT, 10 confirmation samples were analyzed off site by MITKEM, and two QC duplicate samples of the 10 off site analysis samples were analyzed by MITKEM. All of these samples were analyzed for VOCs. Groundwater samples were not collected at locations CPT07, CPT08, and CPT13 due to shallow refusal of the CPT sampling equipment. The procedures used for the CPT groundwater sampling are described in Subsection 4.3, and the CPT groundwater results for VOCs are presented in Table 5-1. The field parameter results are contained on the *Water Sample Collection Forms,* attached in Appendix C. The analytical data are attached in Appendix D.

VOC Results

Thirteen VOCs were detected above method detection limits in the groundwater samples. These detections are summarized below:

- Acetone was detected in 18 samples at concentrations from 2 µg/L in CPT12-05, CPT12-06, and CPT12-07, to 470 µg/L in CPT02-03.
- Methylene chloride was only detected in sample CPT03-05 at a concentration of 0.5 µg/L.
- 1,1-Dichloroethane was only detected in sample CPT11-05 and its duplicate at a concentration of 2 µg/L.
- 2-Butanone was only detected in sample CPT05-06 at a concentration of 16 µg/L.
- Cis-1,2-dichloroethene was detected in five samples at a concentration of 1 µg/L in samples CPT01-03 through CPT01-06, and at a concentration of 2 µg/L in sample CPT01-02.
- 1,1,1-Trichloroethane was detected in 21 samples from locations CPT01, CPT03, CPT10 and CPT11. Detected concentrations ranged from 0.7 µg/L in sample CPT11-08 to 3 µg/L in samples CPT11-05, and CPT11-06.
- Benzene was only detected in sample CPT09-01 and duplicate sample CPT12-04DUP at a concentration of 0.5 µg/L, and in sample CPT09-07 at concentration of 0.6 µg/L.
- Trichloroethene was detected in all of the 8 samples from location CPT01 at concentrations from 2 to 4 µg/L.
- Toluene was detected in 75 samples, and at least once at each CPT sampling location. Detected concentrations ranged from 0.5 µg/L to 3 µg/L.

- Tetrachloroethene was only detected in sample CPT10-04 and its duplicate at a concentration of 0.6 µg/L, and in sample CPT10-02 at a concentration of 0.9 µg/L.
- Ethylbenzene was only detected in sample CPT09-07 at a concentration of 0.6 µg/L.
- Xylenes were detected at concentrations of 0.5 µg/L, in sample CPT02-02, 0.6 µg/L in samples CPT02-01, CPT02-07, and CPT11-01, and 0.7 µg/L in samples CPT06-01 and CPT09-07.

Field Parameter Results

- DO was detected at concentrations from 5.2 to 12.0 mg/L. Most of the results were found to be between 8 and 10 mg/L.
- ORP was measured at concentrations from -199 to 155 mV. These values were fairly evenly distributed between the maximum and minimum and were not found to be dependent on depth.
- Fe^{+2} was detected in 17 samples up to a concentration of 1.1 mg/L.

5.3 MONITORING WELL SAMPLING

Groundwater samples were collected from 15 monitoring wells and analyzed for VOCs. Eight of the samples, primarily from the deep wells, were also analyzed for water quality parameters. The water quality parameters included ammonia, COD, nitrate, nitrite, orthophosphate, sulfate, sulfide, and Fe^{+2}. Each sample was analyzed in the field for dissolved oxygen, oxidation-reduction potential, and Fe^{+2}. The procedures used for monitoring well sampling are described in Subsection 4.4. The VOC and water quality parameter results are presented in Tables 5-2 and 5-3. Field parameters are presented on Table 5-3 for samples which were also analyzed for water quality parameters. Field parameters for the remaining samples are found on the *Water Sample Collection Forms* attached in Appendix C. Analytical data are attached in Appendix D.

VOC Results

Six VOCs were detected above method detection limits in the monitoring well samples and are listed below:

- 1,1,2-Trichloro-1,2,2-trifluoromethane was detected in sample MW103S at a concentration of 2 µg/L, and in sample MW103D and its QC duplicate at concentrations of 300 and 180 µg/L, respectively.
- Cis-1,2-Dichloroethene was detected in sample MW105S at a concentration of 1 µg/L, and in sample MW105D and its QC duplicate at concentrations of 1 µg/L and 2 µg/L, respectively.
- 1,1,1-Trichloroethane was detected in eight samples at concentrations from 1 to 3 µg/L from MW103D, MW104D, MW104S, MW105D, MW105S, and MW112.
- Trichloroethene was detected in four samples at concentration from 2 to 3 µg/L, from MW101D, MW105D and MW105S.
- Tetrachloroethene was detected in eight samples at concentrations from 0.5 to 9 µg/L, from MW103D, MW103S, MW105D, MW105S and MW108D.

Water Quality Parameters

The results of the water quality analyses for monitoring well samples are presented in Table 5-3, and are summarized below:

- Ammonia and sulfide concentrations in all wells were below their minimum detectable concentrations.
- COD was detected in well MW112 at a concentration of 10 mg/L.
- Nitrite was detected in MW101D at a concentration of 7.8 mg/L.

- Nitrate concentrations range from 3.3 mg/L in well MW112 to 8.5 mg/L in MW108D.
- Orthophosphate concentrations range from non-detectable in MW102D, MW105D and MW108D to 0.69 mg/L in MW103D.
- Sulfate concentrations range from 15 mg/L in MW102D to 27 mg/L in MW101D.

Field Parameter Results

- DO was detected at concentrations from 2.8 to 7.7 mg/L. Most of the readings were between 5.5 and 8 mg/L, however, readings from MW104S, MW105S, and MW105D were 3.2, 4.8, and 2.8 mg/L, respectively.
- ORP was measured from 4 to 213 mV. Most of these measurements were found to be greater than 100 mV.
- Fe^{+2} was not detected in any of the monitoring well samples.

5.4 RESIDENTIAL WELL SAMPLING

Groundwater samples were collected from 22 residential wells. Each sample was analyzed for VOCs by the on-site laboratory (ESAT) as well as for Fe^{+2}, which was measured in the field at the time the sample was collected. Of the 22 total samples collected, two were also sent to an off-site laboratory for confirmation VOC analysis. At locations RW01 through RW05 and RW07, additional volume was collected for water quality parameter analysis, which included ammonia, COD, nitrate, nitrite, orthophosphate, sulfate, and sulfide. The procedures for residential well sampling are described in Subsection 4.5. The VOC and water quality parameter results are presented in Tables 5-4 and 5-5. Field parameters are presented on Table 5-5 for samples also analyzed for water quality parameters. Field parameters for the remaining samples are found on the sample collection forms attached in Appendix C. Analytical data are attached in Appendix D.

VOC Results

Six VOCs were detected above method detection limits in the residential well samples and are listed below:

- Acetone was detected in sample RW03 and duplicate sample RW05 at concentrations of 0.8 µg/L and 0.6 µg/L, respectively.
- Chloroform was detected only in sample RW08 at a concentration of 0.9 µg/L.
- Cis-1,2-Dichloroethene was detected in samples from RW04 at a concentrations of 1 and 2 µg/L.
- 1,1,1-Trichloroethane was detected in 11 samples from RW03, RW04, RW07, RW08, RW11 and RW19 at concentrations from 1 to 5 µg/L.
- Trichloroethene was detected in five samples from RW04, RW07 and RW19 at concentrations from 0.7 to 6 µg/L.
- Tetrachloroethene was detected at a concentration of 2 µg/L in samples from RW04, and at a concentration of 0.9 µg/L in sample RW19 and its duplicate.

Water Quality Parameters

The results of the water quality analyses for residential well samples are presented in Table 5-5.

- COD, ammonia, and nitrite were not detected in any of the residential well samples above their respective method detection limits.
- Nitrate was detected in the samples from RW02 and RW04 at concentrations of 3.9 and 6.3 mg/L, respectively.
- Orthophosphate was detected in samples from RW01, RW03, and RW07. Concentrations detected ranged from 0.029 mg/L in the sample from RW07 to 0.051 mg/L in the samples from RW01 and RW03.

- Sulfate was detected in samples from RW04 and RW07 at concentrations of 19 and 28 mg/L, respectively.

- Sulfide was detected in samples from RW03 and RW04 at concentrations of 2.4 and 1.6 mg/L, respectively.

Field Parameter Results

- DO concentrations were found from 3.25 to 9.2 mg/L in the residential wells. Most of the measurements were found to be below 6 mg/L.

- ORP was measured from 80 to 238 mV in the residential wells. Measurements were fairly well distributed between these values.

- Fe^{+2} was not detected in any of the residential well samples.

5.5 SEDIMENT SAMPLING

A total of 6 sediment samples (SD01 through SD06) were collected during the field investigation from Dry Creek and the Rock River and analyzed for VOCs and TOC. One sample and a duplicate from SD04 were sent to an off-site laboratory (DATACHEM) for VOC and TOC analysis. The procedures used for the sediment sampling are described in Subsection 4.6. The sediment sample results are presented in Tables 5-6 and 5-7 and the analytical data are attached in Appendix D.

- Benzene was detected only in the duplicate sample analyzed by DATACHEM, from location SD04, at a concentration of 2 ug/kg.

- Chloroform was detected only in the sample from location SD01 at a concentration of 8 ug/kg.

- Methyl acetate (Methylene chloride) was detected in samples from SD01, SD02, and SD05 at concentrations of 5, 9, and 9 ug/kg, respectively.

- Toluene was detected only in the duplicate sample analyzed by DATACHEM, from location SD04, at a concentration of 0.7 ug/kg.

- TOC was detected in all of the samples at concentrations from 4,200 mg/kg in the sample from SD04 to 30,000 mg/kg in the sample from SD03.

5.6 SURFACE WATER SAMPLING

Six surface water samples were collected from Dry Creek and the Rock River at approximately the same locations as the sediment samples. Each sample was analyzed for VOCs. One sample and a QC duplicate from SW04 were sent to an off-site laboratory (MITKEM) for confirmation VOC analysis. The procedures used for surface water sampling are described in Subsection 4.7. The surface water sample results are presented in Table 5-8 and the analytical data are attached in Appendix D.

- VOCs were not detected in any of the surface water samples.

5.7 GROUNDWATER ELEVATION MEASUREMENTS

The depth to groundwater was measured in 16 monitoring wells, as described in section 4.8. The depth to groundwater measurement and the elevation of the reference point were used to calculate the elevation of groundwater in each well. Groundwater elevations were from 722.58 to 735.22 feet above MSL. In each of the well clusters, the groundwater elevation in the shallow and deep wells was found to be nearly identical. The biggest difference in groundwater elevations at any well cluster measured was 0.08 ft.

Table 5-1
Groundwater Analytical Results - CPT - VOCs
Evergreen Manor, Roscoe, Illinois

Sample ID:	CPT-01-01	CPT-01-02	CPT-01-03	CPT-01-04	CPT-01-05	CPT-01-06	CPT-01-07	CPT-01-08
Sample Number:	—	—	—	—	—	—	—	—
Sample Date:	5/25/00	5/25/00	5/25/00	5/25/00	5/25/00	5/25/00	5/25/00	5/25/00
Laboratory:	ESAT	ESAT	ESAT	ESAT	ESAT	ESAT	ESAT	ESAT
Sample Screen Depth (ft below ground):	99	89	79	69	59	49	39	29
Units:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Parameter:								
Dichlorodifluoromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
chloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Vinyl Chloride	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromomethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichlorofluoromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloro-1,2,2-trifluoromethane	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
1,1-Dichloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Acetone	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ	15 B	2 UJ
Carbon Disulfide	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methylene Chloride	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methyl Acetate	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trans-1,2-Dichloroethene	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
1,1-Dichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
2-Butanone	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
Cis-1,2-Dichloroethene	4 U	2 J	1 J	1 J	1 J	1 J	4 U	4 U
Methyl tert-Butyl Ether	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroform	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
Carbon Tetrachloride	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
1,1,1-Trichloroethane	2 U	1 J	1 J	1 J	1 J	2 U	1 J	2 U
Benzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichloroethene	2 J	3 J	4 J	4 J	3 J	4 J	3 J	2 J
1,2-Dichloropropane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Cis-1,3-Dichloropropene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trans-1,3-Dichloropropene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Dibromochloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromoform	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
4-Methyl-2-pentanone	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Toluene	0.7 J	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Tetrachloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
2-Hexanone	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dibromoethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Ethylbenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
m-&/or p-Xylene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
o-xylene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Xylenes (total)	—	—	—	—	—	—	—	—
Styrene	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
1,1,2,2-Tetrachloroethane	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
1,3-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2,4-Trichlorobenzene	—	—	—	—	—	—	—	—
1,2-Dibromo-3-chloropropane	—	—	—	—	—	—	—	—
Bromochloromethane	—	—	—	—	—	—	—	—

Table 5-1
Groundwater Analytical Results - CPT - VOCs
Evergreen Manor, Roscoe, Illinois

Sample ID:	CPT-02-01	CPT02-01	CPT-02-02	CPT-02-03	CPT02-03	CPT-02-04	CPT-02-05	CPT-02-06
Sample Number:	—	EABX3	—	—	EABX4	—	—	—
Sample Date:	6/2/00	6/2/00	6/2/00	6/2/00	6/2/00	6/2/00	6/2/00	6/2/00
Laboratory:	ESAT	MittKem	ESAT	ESAT	MittKem	ESAT	ESAT	ESAT
Sample Screen Depth (ft below ground):	28	28	34	42	42	51	68	78
Units:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Parameter:								
Dichlorodifluoromethane	1 U	—	1 U	1 U	—	1 U	1 U	1 U
chloromethane	1 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U
Vinyl Chloride	1 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U
Bromomethane	1 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U
Chloroethane	1 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U
Trichlorofluoromethane	1 U	—	1 U	1 U	—	1 U	1 U	1 U
1,1,2-Trichloro-1,2,2-trifluoromethane	2 UJ	—	2 UJ	2 UJ	—	2 UJ	2 UJ	2 UJ
1,1-Dichloroethene	1 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U
Acetone	2 UJ	5 U	2 UJ	55 J	470	2 UJ	2 UJ	2 UJ
Carbon Disulfide	1 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U
Methylene Chloride	1 U	2 U	1 U	1 U	10 U	1 U	1 U	1 U
Methyl Acetate	1 UJ	—	1 UJ	1 UJ	—	1 UJ	1 UJ	1 UJ
Trans-1,2-Dichloroethene	2 U	1 U	2 U	2 U	5 U	2 U	2 U	2 U
1,1-Dichloroethane	1 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U
2-Butanone	11 UJ	5 U	11 UJ	11 UJ	25 U	11 UJ	11 UJ	11 UJ
Cis-1,2-Dichloroethene	4 U	1 U	4 U	4 U	5 U	4 U	4 U	4 U
Methyl tert-Butyl Ether	1 UJ	—	1 UJ	1 UJ	—	1 UJ	1 UJ	1 UJ
1,2-Dichloroethane	1 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U
Chloroform	3 U	1 U	3 U	3 U	5 U	3 U	3 U	3 U
Carbon Tetrachloride	2 U	1 U	2 U	2 U	5 U	2 U	2 U	2 U
1,1,1-Trichloroethane	2 U	1 U	2 U	2 U	5 U	2 U	2 U	2 U
Benzene	1 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U
Trichloroethene	1 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U
1,2-Dichloropropane	1 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U
Bromodichloromethane	1 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U
Cis-1,3-Dichloropropene	1 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U
Trans-1,3-Dichloropropene	1 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U
1,1,2-Trichloroethane	1 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U
Dibromochloromethane	1 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U
Bromoform	1 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U
4-Methyl-2-pentanone	5 U	5 U	5 U	5 U	25 U	5 U	5 U	5 U
Toluene	0.5 J	0.5 J	0.6 J	0.7 J	5 U	0.5 J	1 J	1 J
Tetrachloroethene	1 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U
2-Hexanone	5 U	5 U	5 U	5 U	25 U	5 U	5 U	5 U
1,2-Dibromoethane	1 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U
Chlorobenzene	1 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U
Ethylbenzene	1 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U
m-&/or p-Xylene	1 U	—	0.5 J	1 U	—	1 U	1 U	1 U
o-xylene	1 U	—	1 U	1 U	—	1 U	1 U	1 U
Xylenes (total)	—	0.6 J	—	—	5 U	—	—	—
Styrene	3 UJ	1 U	3 UJ	3 UJ	5 U	3 UJ	3 UJ	3 UJ
1,1,2,2-Tetrachloroethane	1 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U
1,3-Dichlorobenzene	1 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U
1,4-Dichlorobenzene	1 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U
1,2-Dichlorobenzene	1 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U
1,2,4-Trichlorobenzene	—	1 U	—	—	5 U	—	—	—
1,2-Dibromo-3-chloropropane	—	1 R	—	—	5 R	—	—	—
Bromochloromethane	—	1 U	—	—	5 U	—	—	—

Table 5-1
Groundwater Analytical Results - CPT - VOCs
Evergreen Manor, Roscoe, Illinois

Sample ID:	CPT-02-07	CPT-03-01	CPT-03-02	CPT-03-02DP	CPT-03-03	CPT-03-04	CPT-03-05	CPT-03-06
Sample Number:	—	—	—	—	—	—	—	—
Sample Date:	6/2/00	5/26/00	5/26/00	5/26/00	5/26/00	5/26/00	5/26/00	6/2/00
Laboratory:	ESAT	ESAT	ESAT	ESAT	ESAT	ESAT	ESAT	ESAT
Sample Screen Depth (ft below ground):	84	29	42	42	54		84	92
Units:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Parameter:								
Dichlorodifluoromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
chloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Vinyl Chloride	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromomethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichlorofluoromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloro-1,2,2-trifluoromethane	2 UJ	2 U	2 U	2 U	2 U	2 U	2 UJ	2 UJ
1,1-Dichloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Acetone	2 UJ	20 B	32 B	19 B	20 B	25 B	9 J	2 UJ
Carbon Disulfide	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methylene Chloride	1 U	1 U	1 U	1 U	1 U	1 U	0.5 J	1 U
Methyl Acetate	1 UJ	1 U	1 U	1 U	1 U	1 U	1 UJ	1 UJ
Trans-1,2-Dichloroethene	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
1,1-Dichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
2-Butanone	11 UJ	11 U	11 U	11 U	11 U	11 U	11 U	11 UJ
Cis-1,2-Dichloroethene	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U
Methyl tert-Butyl Ether	1 UJ	1 U	1 U	1 U	1 U	1 U	1 U	1 UJ
1,2-Dichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroform	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
Carbon Tetrachloride	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
1,1,1-Trichloroethane	2 U	2 U	2 U	2 U	1 J	2 J	2 U	0.9 J
Benzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloropropane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Cis-1,3-Dichloropropene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trans-1,3-Dichloropropene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Dibromochloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromoform	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
4-Methyl-2-pentanone	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Toluene	1 U	0.8 J	1 J	0.8 J	0.6 J	0.8 J	1 J	2 J
Tetrachloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
2-Hexanone	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dibromoethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Ethylbenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
m-&/or p-Xylene	0.6 J	1 U	1 U	1 U	1 U	1 U	1 U	1 U
o-xylene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Xylenes (total)	—	—	—	—	—	—	—	—
Styrene	3 UJ	3 U	3 U	3 U	3 U	3 U	3 U	3 UJ
1,1,2,2-Tetrachloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,3-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2,4-Trichlorobenzene	—	—	—	—	—	—	—	—
1,2-Dibromo-3-chloropropane	—	—	—	—	—	—	—	—
Bromochloromethane	—	—	—	—	—	—	—	—

Table 5-1
Groundwater Analytical Results - CPT - VOCs
Evergreen Manor, Roscoe, Illinois

Sample ID:	CPT03-06	CPT-03-07	CPT-04-01	CPT-04-02	CPT-04-02DUP	CPT-04-02	CPT04-02DP	CPT-04-03
Sample Number:	EABX5	—	—	—	—	EABW5	EABW6	—
Sample Date:	6/2/00	6/2/00	5/29/00	5/29/00	5/29/00	5/29/00	5/29/00	5/29/00
Laboratory:	MitKem	ESAT	ESAT	ESAT	ESAT	MitKem	MitKem	ESAT
Sample Screen Depth (ft below ground):	92	102	32	46	46	46	46	56
Units:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Parameter:								
Dichlorodifluoromethane	—	1 U	1 U	1 U	1 U	—	—	1 U
chloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Vinyl Chloride	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromomethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichlorofluoromethane	—	1 U	1 U	1 U	1 U	—	—	1 U
1,1,2-Trichloro-1,2,2-trifluoromethane	—	2 UJ	2 UJ	2 UJ	2 UJ	—	—	2 UJ
1,1-Dichloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Acetone	5 U	2 UJ	2 U	10 B	2 U	5 U	5 U	2 U
Carbon Disulfide	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methylene Chloride	2 U	1 U	1 U	1 U	1 U	2 U	2 U	1 U
Methyl Acetate	—	1 UJ	1 UJ	1 UJ	1 UJ	—	—	1 UJ
Trans-1,2-Dichloroethene	1 U	2 U	2 U	2 U	2 U	1 U	1 U	2 U
1,1-Dichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
2-Butanone	5 U	11 UJ	11 U	11 U	11 U	5 U	5 U	11 U
Cis-1,2-Dichloroethene	1 U	4 U	4 U	4 U	4 U	1 U	1 U	4 U
Methyl tert-Butyl Ether	—	1 UJ	1 U	1 U	1 U	—	—	1 U
1,2-Dichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroform	1 U	3 U	3 U	3 U	3 U	1 U	1 U	3 U
Carbon Tetrachloride	1 U	2 U	2 U	2 U	2 U	1 U	1 U	2 U
1,1,1-Trichloroethane	0.9 J	0.8 J	2 U	2 U	2 U	1 U	1 U	2 U
Benzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloropropane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Cis-1,3-Dichloropropene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trans-1,3-Dichloropropene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Dibromochloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromoform	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
4-Methyl-2-pentanone	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Toluene	2	2 J	1 J	0.8 J	0.9 J	0.6 J	0.8 J	0.8 J
Tetrachloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
2-Hexanone	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dibromoethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Ethylbenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
m-&/or p-Xylene	—	1 U	1 U	1 U	1 U	—	—	1 U
o-xylene	—	1 U	1 U	1 U	1 U	—	—	1 U
Xylenes (total)	1 U	—	—	—	—	1 U	1 U	—
Styrene	1 U	3 UJ	3 U	3 U	3 U	1 U	1 U	3 U
1,1,2,2-Tetrachloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,3-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2,4-Trichlorobenzene	1 U	—	—	—	—	1 U	1 U	—
1,2-Dibromo-3-chloropropane	1 R	—	—	—	—	1 R	1 R	—
Bromochloromethane	1 U	—	—	—	—	1 U	1 U	—

Table 5-1
Groundwater Analytical Results - CPT - VOCs
Evergreen Manor, Roscoe, Illinois

Sample ID:	CPT-04-04	CPT-04-05	CPT-04-06	CPT-04-07	CPT-05-01	CPT-05-02	CPT-05-03	CPT-05-04
Sample Number:	---	---	---	---	---	---	---	---
Sample Date:	5/29/00	5/29/00	5/29/00	5/29/00	5/29/00	5/29/00	5/29/00	5/29/00
Laboratory:	ESAT	ESAT	ESAT	ESAT	ESAT	ESAT	ESAT	ESAT
Sample Screen Depth (ft below ground):	71	78	84	93	36	43	51	57
Units:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Parameter:								
Dichlorodifluoromethane	1 U		1 U	1 U	1 U	1 U	1 U	1 U
chloromethane	1 U		1 U	1 U	1 U	1 U	1 U	1 U
Vinyl Chloride	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromomethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichlorofluoromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloro-1,2,2-trifluoromethane	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ
1,1-Dichloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Acetone	2 U	2 U	8 B	9 B	2 U	2 U	2 U	2 U
Carbon Disulfide	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methylene Chloride	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methyl Acetate	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
Trans-1,2-Dichloroethene	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
1,1-Dichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
2-Butanone	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
Cis-1,2-Dichloroethene	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U
Methyl tert-Butyl Ether	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroform	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
Carbon Tetrachloride	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
1,1,1-Trichloroethane	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Benzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloropropane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Cis-1,3-Dichloropropene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trans-1,3-Dichloropropene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Dibromochloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromoform	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
4-Methyl-2-pentanone	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Toluene	0.7 J	1 J	0.8 J	1 J	1 J	1 J	1 J	1 J
Tetrachloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
2-Hexanone	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dibromoethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Ethylbenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
m-&/or p-Xylene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
o-xylene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Xylenes (total)	---	---	---	---	---	---	---	---
Styrene	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
1,1,2,2-Tetrachloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,3-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2,4-Trichlorobenzene	---	---	---	---	---	---	---	---
1,2-Dibromo-3-chloropropane	---	---	---	---	---	---	---	---
Bromochloromethane	---	---	---	---	---	---	---	---

Table 5-1
Groundwater Analytical Results - CPT - VOCs
Evergreen Manor, Roscoe, Illinois

Sample ID:	CPT-05-05	CPT-05-05DUP	CPT-05-06	CPT-05-07	CPT-06-01	CPT-06-02	CPT-06-03	CPT-06-04
Sample Number:	—	—	—	—	—	—	—	—
Sample Date:	5/30/00	5/30/00	5/30/00	5/30/00	6/1/00	6/1/00	6/1/00	6/1/00
Laboratory:	ESAT	ESAT	ESAT	ESAT	ESAT	ESAT	ESAT	ESAT
Sample Screen Depth (ft below ground):	69.5	69.5	78	87	35	42	53	62
Units:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Parameter:								
Dichlorodifluoromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
chloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Vinyl Chloride	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromomethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichlorofluoromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloro-1,2,2-trifluoromethane	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ
1,1-Dichloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Acetone	2 U	2 U	100 J	2 U	2 U	53 J	11 J	7 J
Carbon Disulfide	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methylene Chloride	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methyl Acetate	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
Trans-1,2-Dichloroethene	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
1,1-Dichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
2-Butanone	11 U	11 U	16 J	11 U	11 U	11 U	11 U	11 U
Cis-1,2-Dichloroethene	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U
Methyl tert-Butyl Ether	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroform	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
Carbon Tetrachloride	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
1,1,1-Trichloroethane	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Benzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloropropane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Cis-1,3-Dichloropropene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trans-1,3-Dichloropropene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Dibromochloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromoform	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
4-Methyl-2-pentanone	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Toluene	1 J	0.6 J	0.8 J	1 J	0.6 J	0.8 J	0.8 J	1 J
Tetrachloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
2-Hexanone	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dibromoethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Ethylbenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
m-&/or p-Xylene	1 U	1 U	1 U	1 U	0.7 J	1 U	1 U	1 U
o-xylene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Xylenes (total)	—	—	—	—	—	—	—	—
Styrene	3 U	3 U	3 U	3 U	3 UJ	3 UJ	3 UJ	3 UJ
1,1,2,2-Tetrachloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,3-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2,4-Trichlorobenzene	—	—	—	—	—	—	—	—
1,2-Dibromo-3-chloropropane	—	—	—	—	—	—	—	—
Bromochloromethane	—	—	—	—	—	—	—	—

Table 5-1
Groundwater Analytical Results - CPT - VOCs
Evergreen Manor, Roscoe, Illinois

Sample ID:	CPT-06-05	CPT-06-06	CPT06-06	CPT-06-07	CPT-09-01	CPT-09-02	CPT-09-03	CPT-09-04
Sample Number:	—	—	EABW9	—	—	—	—	—
Sample Date:	6/1/00	6/1/00	6/1/00	6/1/00	5/30/00	5/30/00	5/30/00	5/30/00
Laboratory:	ESAT	ESAT	MitKem	ESAT	ESAT	ESAT	ESAT	ESAT
Sample Screen Depth (ft below ground):	74	86	86	92	36	46	56	68
Units:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Parameter:								
Dichlorodifluoromethane	1 U	1 U	—	1 U	1 U	1 U	1 U	1 U
chloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Vinyl Chloride	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromomethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichlorofluoromethane	1 U	1 U	—	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloro-1,2,2-trifluoromethane	2 UJ	2 UJ	—	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ
1,1-Dichloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Acetone	11 J	2 U	7 U	5 J	2 U	2 U	2 U	2 U
Carbon Disulfide	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methylene Chloride	1 U	1 U	2 U	1 U	1 U	1 U	1 U	1 U
Methyl Acetate	1 UJ	1 UJ	—	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
Trans-1,2-Dichloroethene	2 U	2 U	1 U	2 U	2 U	2 U	2 U	2 U
1,1-Dichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
2-Butanone	11 U	11 U	5 U	11 U	11 U	11 U	11 U	11 U
Cis-1,2-Dichloroethene	4 U	4 U	1 U	4 U	4 U	4 U	4 U	4 U
Methyl tert-Butyl Ether	1 U	1 U	—	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroform	3 U	3 U	1 U	3 U	3 U	3 U	3 U	3 U
Carbon Tetrachloride	2 U	2 U	1 U	2 U	2 U	2 U	2 U	2 U
1,1,1-Trichloroethane	2 U	2 U	1 U	2 U	2 U	2 U	2 U	2 U
Benzene	1 U	1 U	1 U	1 U	0.5 J	1 U	1 U	1 U
Trichloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloropropane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Cis-1,3-Dichloropropene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trans-1,3-Dichloropropene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Dibromochloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromoform	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
4-Methyl-2-pentanone	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Toluene	1 J	2 J	2	1 J	1 J	0.8 J	0.8 J	0.8 J
Tetrachloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
2-Hexanone	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dibromoethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Ethylbenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
m-&/or p-Xylene	1 U	1 U	—	1 U	1 U	1 U	1 U	1 U
o-xylene	1 U	1 U	—	1 U	1 U	1 U	1 U	1 U
Xylenes (total)	—	—	1 U	—	—	—	—	—
Styrene	3 UJ	3 UJ	1 U	3 UJ	3 U	3 U	3 U	3 U
1,1,2,2-Tetrachloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,3-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2,4-Trichlorobenzene	—	—	1 U	—	—	—	—	—
1,2-Dibromo-3-chloropropane	—	—	1 R	—	—	—	—	—
Bromochloromethane	—	—	1 U	—	—	—	—	—

Table 5-1
Groundwater Analytical Results - CPT - VOCs
Evergreen Manor, Roscoe, Illinois

Sample ID:	CPT-09-05	CPT-09-06	CPT-09-07	CPT-10-01	CPT-10-02	CPT-10-03	CPT-10-04	CPT-10-05
Sample Number:	—	—	—	—	—	—	—	—
Sample Date:	5/30/00	5/30/00	5/30/00	5/31/00	5/31/00	5/31/00	6/1/00	6/1/00
Laboratory:	ESAT	ESAT	ESAT	ESAT	ESAT	ESAT	ESAT	ESAT
Sample Screen Depth (ft below ground):	75	85	88	25	36	42	55	65
Units:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Parameter:								
Dichlorodifluoromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
chloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Vinyl Chloride	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromomethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichlorofluoromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloro-1,2,2-trifluoromethane	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ
1,1-Dichloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Acetone	2 U	11 J	8 J	2 U	2 U	40 B	2 U	2 U
Carbon Disulfide	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methylene Chloride	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methyl Acetate	1 UJ	1 UJ	1 UJ	1 U	1 U	1 U	1 UJ	1 U
Trans-1,2-Dichloroethene	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
1,1-Dichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
2-Butanone	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
Cis-1,2-Dichloroethene	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U
Methyl tert-Butyl Ether	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroform	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
Carbon Tetrachloride	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
1,1,1-Trichloroethane	2 U	2 U	2 U	2 U	1 J	2 U	1 J	0.8 J
Benzene	1 U	1 U	0.6 J	1 U	1 U	1 U	1 U	1 U
Trichloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloropropane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Cis-1,3-Dichloropropene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trans-1,3-Dichloropropene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Dibromochloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromoform	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
4-Methyl-2-pentanone	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Toluene	0.5 J	0.8 J	2 J	0.9 J	1 U	1 J	0.5 J	0.9 J
Tetrachloroethene	1 U	1 U	1 U	1 U	0.9 J	1 U	0.6 J	1 U
2-Hexanone	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dibromoethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Ethylbenzene	1 U	1 U	0.6 J	1 U	1 U	1 U	1 U	1 U
m-&/or p-Xylene	1 U	1 U	0.7 J	1 U	1 U	1 U	1 U	1 U
o-xylene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Xylenes (total)	—	—	—	—	—	—	—	—
Styrene	3 U	3 U	3 U	3 U	3 U	3 U	3 UJ	3 U
1,1,2,2-Tetrachloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,3-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2,4-Trichlorobenzene	—	—	—	—	—	—	—	—
1,2-Dibromo-3-chloropropane	—	—	—	—	—	—	—	—
Bromochloromethane	—	—	—	—	—	—	—	—

Table 5-1
Groundwater Analytical Results - CPT - VOCs
Evergreen Manor, Roscoe, Illinois

Sample ID:	CPT-10-06	CPT-10-07	CPT-10-4DUP	CPT-11-01	CPT11-01	CPT-11-02	CPT-11-03	CPT-11-04
Sample Number:	---	---	---	---	EABX7	---	---	---
Sample Date:	6/1/00	6/1/00	6/1/00	6/3/00	6/3/00	6/3/00	6/3/00	6/3/00
Laboratory:	ESAT	ESAT	ESAT	ESAT	MitKem	ESAT	ESAT	ESAT
Sample Screen Depth (ft below ground):	73	90	55	45	45	58	70	81
Units:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Parameter:								
Dichlorodifluoromethane	1 U	1 U	1 U	1 U	---	1 U	1 U	1 U
chloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Vinyl Chloride	1 U	1 U	1 U	1 UJ	1 U	1 UJ	1 UJ	1 UJ
Bromomethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichlorofluoromethane	1 U	1 U	1 U	1 U	---	1 U	1 U	1 U
1,1,2-Trichloro-1,2,2-trifluoromethane	2 UJ	2 UJ	2 UJ	2 UJ	---	2 UJ	2 UJ	2 UJ
1,1-Dichloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Acetone	24 J	2 U	2 U	2 UJ	5 U	2 UJ	9 J	2 UJ
Carbon Disulfide	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methylene Chloride	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U
Methyl Acetate	1 UJ	1 UJ	1 UJ	1 UJ	---	1 UJ	1 UJ	1 UJ
Trans-1,2-Dichloroethene	2 U	2 U	2 U	2 U	1 U	2 U	2 U	2 U
1,1-Dichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
2-Butanone	11 U	11 U	11 U	11 UJ	5 U	11 UJ	11 UJ	11 UJ
Cis-1,2-Dichloroethene	4 U	4 U	4 U	4 U	1 U	4 U	4 U	4 U
Methyl tert-Butyl Ether	1 U	1 U	1 U	1 UJ	---	1 UJ	1 UJ	1 UJ
1,2-Dichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroform	3 U	3 U	3 U	3 U	1 U	3 U	3 U	3 U
Carbon Tetrachloride	2 U	2 U	2 U	2 U	1 U	2 U	2 U	2 U
1,1,1-Trichloroethane	2 U	2 U	1 J	2 U	1 U	2 U	0.8 J	0.8 J
Benzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloropropane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Cis-1,3-Dichloropropene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trans-1,3-Dichloropropene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Dibromochloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromoform	1 U	1 U	1 U	1 UJ	1 U	1 UJ	1 UJ	1 UJ
4-Methyl-2-pentanone	5 U	5 U	5 U	5 UJ	5 U	5 UJ	5 UJ	5 UJ
Toluene	1 J	1 J	1 U	1 U	1 U	1 J	1 J	0.9 J
Tetrachloroethene	1 U	1 U	0.6 J	1 U	1 U	1 U	1 U	1 U
2-Hexanone	5 U	5 U	5 U	5 UJ	5 U	5 UJ	5 UJ	5 UJ
1,2-Dibromoethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Ethylbenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
m-&/or p-Xylene	1 U	1 U	1 U	1 U	---	1 U	1 U	1 U
o-xylene	1 U	1 U	1 U	1 U	---	1 U	1 U	1 U
Xylenes (total)	---	---	---	---	0.6 J	---	---	---
Styrene	3 UJ	3 UJ	3 UJ	3 U	1 U	3 U	3 U	3 U
1,1,2,2-Tetrachloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,3-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2,4-Trichlorobenzene	---	---	---	---	1 U	---	---	---
1,2-Dibromo-3-chloropropane	---	---	---	---	1 R	---	---	---
Bromochloromethane	---	---	---	---	1 U	---	---	---

Table 5-1
Groundwater Analytical Results - CPT - VOCs
Evergreen Manor, Roscoe, Illinois

Sample ID:	CPT-11-05	CPT11-05	CPT11-05DP	CPT-11-06	CPT-11-07	CPT11-08	CPT-11-08	CPT-12-01
Sample Number:	—	EABX9	EABQ1	—	—	EABQ2	—	—
Sample Date:	6/3/00	6/3/00	6/3/00	6/3/00	6/3/00	6/3/00	6/3/00	6/5/00
Laboratory:	ESAT	MitKem	MitKem	ESAT	ESAT	MitKem	ESAT	ESAT
Sample Screen Depth (ft below ground):	93	93	93	102	114	125	125	45
Units:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Parameter:								
Dichlorodifluoromethane	1 U	—	—	1 U	1 U	—	1 U	1 U
chloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 UJ	1 U
Vinyl Chloride	1 UJ	1 U	1 U	1 UJ	1 UJ	1 U	1 U	1 U
Bromomethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichlorofluoromethane	1 U	—	—	1 U	1 U	—	1 U	1 U
1,1,2-Trichloro-1,2,2-trifluoromethane	2 UJ	—	—	2 UJ	2 UJ	—	2 U	2 U
1,1-Dichloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Acetone	2 UJ	5 U	5 U	9 J	13 J	5 U	2 UJ	1 B
Carbon Disulfide	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methylene Chloride	1 U	2 U	2 U	1 U	1 U	2 U	1 U	1 U
Methyl Acetate	1 UJ	—	—	1 UJ	1 UJ	—	1 UJ	1 UJ
Trans-1,2-Dichloroethene	2 U	1 U	1 U	2 U	2 U	1 U	2 U	2 U
1,1-Dichloroethane	1 U	2	2	1 U	1 U	1 U	1 UJ	1 U
2-Butanone	11 UJ	5 U	5 U	11 UJ	11 UJ	5 U	11 UJ	11 U
Cis-1,2-Dichloroethene	4 U	1 U	1 U	4 U	4 U	1 U	4 U	4 U
Methyl tert-Butyl Ether	1 UJ	—	—	1 UJ	1 UJ	—	1 U	1 U
1,2-Dichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroform	3 U	1 U	1 U	3 U	3 U	1 U	3 U	3 U
Carbon Tetrachloride	2 U	1 U	1 U	2 U	2 U	1 U	2 U	2 U
1,1,1-Trichloroethane	2 J	2	3	3 J	2 U	0.7 J	2 U	2 U
Benzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloropropane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Cis-1,3-Dichloropropene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trans-1,3-Dichloropropene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 UJ	1 U
Dibromochloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromoform	1 UJ	1 U	1 U	1 UJ	1 UJ	1 U	1 U	1 U
4-Methyl-2-pentanone	5 UJ	5 U	5 U	5 UJ	5 UJ	5 U	5 U	5 U
Toluene	1 J	2	0.8 J	1 J	2 J	2	3 J	0.5 J
Tetrachloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
2-Hexanone	5 UJ	5 U	5 U	5 UJ	5 UJ	5 U	5 UJ	5 U
1,2-Dibromoethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Ethylbenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
m-&/or p-Xylene	1 U	—	—	1 U	1 U	—	1 U	1 U
o-xylene	1 U	—	—	1 U	1 U	—	1 U	1 U
Xylenes (total)	—	1 U	1 U	—	—	1 U	—	—
Styrene	3 U	1 U	1 U	3 U	3 U	1 U	3 U	3 U
1,1,2,2-Tetrachloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,3-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2,4-Trichlorobenzene	—	1 U	1 U	—	—	1 U	—	—
1,2-Dibromo-3-chloropropane	—	1 R	1 R	—	—	1 R	—	—
Bromochloromethane	—	1 U	1 U	—	—	1 U	—	—

Table 5-1
Groundwater Analytical Results - CPT - VOCs
Evergreen Manor, Roscoe, Illinois

Sample ID:	CPT-12-01DUP	CPT-12-02	CPT-12-03	CPT-12-03	CPT-12-04	CPT-12-04DUP	CPT-12-05	CPT12-06
Sample Number:	—	—	—	EABQ3	—	—	—	EABQ7
Sample Date:	6/5/00	6/5/00	6/5/00	6/5/00	6/5/00	6/5/00	6/5/00	6/5/00
Laboratory:	ESAT	ESAT	ESAT	MitKem	ESAT	ESAT	ESAT	MitKem
Sample Screen Depth (ft below ground):		62	70	70	81	81	93	102
Units:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Parameter:								
Dichlorodifluoromethane	1 U	1 U	1 U	—	1 U	1 U	1 U	—
chloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Vinyl Chloride	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromomethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichlorofluoromethane	1 U	1 U	1 U	—	1 U	1 U	1 U	—
1,1,2-Trichloro-1,2,2-trifluoromethane	2 U	2 U	2 U	—	2 U	2 U	2 U	—
1,1-Dichloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Acetone	1 B	1 B	2 B	5 U	2 B	7 B	2	5 U
Carbon Disulfide	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methylene Chloride	1 U	1 U	1 U	2 U	1 U	1 U	1 U	2 U
Methyl Acetate	1 UJ	1 UJ	1 UJ	—	1 UJ	1 UJ	1 UJ	—
Trans-1,2-Dichloroethene	2 U	2 U	2 U	1 U	2 U	2 U	2 U	1 U
1,1-Dichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
2-Butanone	11 U	11 U	11 U	5 U	11 U	11 U	11 U	5 U
Cis-1,2-Dichloroethene	4 U	4 U	4 U	1 U	4 U	4 U	4 U	1 U
Methyl tert-Butyl Ether	1 U	1 U	1 U	—	1 U	1 U	1 U	—
1,2-Dichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroform	3 U	3 U	3 U	1 U	3 U	3 U	3 U	1 U
Carbon Tetrachloride	2 U	2 U	2 U	1 U	2 U	2 U	2 U	1 U
1,1,1-Trichloroethane	2 U	2 U	2 U	1 U	2 U	2 U	2 U	1 U
Benzene	1 U	1 U	1 U	1 U	1 U	0.5 J	1 U	1 U
Trichloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloropropane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Cis-1,3-Dichloropropene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trans-1,3-Dichloropropene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Dibromochloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromoform	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
4-Methyl-2-pentanone	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Toluene	0.5 J	1 U	0.9 J	0.8 J	0.9 J	1 U	2 J	1
Tetrachloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
2-Hexanone	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dibromoethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Ethylbenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
m-&/or p-Xylene	1 U	1 U	1 U	—	1 U	1 U	1 U	—
o-xylene	1 U	1 U	1 U	—	1 U	1 U	1 U	—
Xylenes (total)	—	—	—	1 U	—	—	—	1 U
Styrene	3 U	3 U	3 U	1 U	3 U	3 U	3 U	1 U
1,1,2,2-Tetrachloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,3-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2,4-Trichlorobenzene	—	—	—	1 U	—	—	—	1 U
1,2-Dibromo-3-chloropropane	—	—	—	1 R	—	—	—	1 R
Bromochloromethane	—	—	—	1 U	—	—	—	1 U

Table 5-1
Groundwater Analytical Results - CPT - VOCs
Evergreen Manor, Roscoe, Illinois

Sample ID:	CPT-12-06	CPT-12-07
Sample Number:	---	---
Sample Date:	6/5/00	6/5/00
Laboratory:	ESAT	ESAT
Sample Screen Depth (ft below ground):	102	118
Units:	ug/L	ug/L
Parameter:		
Dichlorodifluoromethane	1 U	1 U
chloromethane	1 U	1 U
Vinyl Chloride	1 U	1 U
Bromomethane	1 U	1 U
Chloroethane	1 U	1 U
Trichlorofluoromethane	1 U	1 U
1,1,2-Trichloro-1,2,2-trifluoromethane	2 U	2 U
1,1-Dichloroethene	1 U	1 U
Acetone	2	2
Carbon Disulfide	1 U	1 U
Methylene Chloride	1 U	1 U
Methyl Acetate	1 UJ	1 UJ
Trans-1,2-Dichloroethene	2 U	2 U
1,1-Dichloroethane	1 U	1 U
2-Butanone	11 U	11 U
Cis-1,2-Dichloroethene	4 U	4 U
Methyl tert-Butyl Ether	1 U	1 U
1,2-Dichloroethane	1 U	1 U
Chloroform	3 U	3 U
Carbon Tetrachloride	2 U	2 U
1,1,1-Trichloroethane	2 U	2 U
Benzene	1 U	1 U
Trichloroethene	1 U	1 U
1,2-Dichloropropane	1 U	1 U
Bromodichloromethane	1 U	1 U
Cis-1,3-Dichloropropene	1 U	1 U
Trans-1,3-Dichloropropene	1 U	1 U
1,1,2-Trichloroethane	1 U	1 U
Dibromochloromethane	1 U	1 U
Bromoform	1 U	1 U
4-Methyl-2-pentanone	5 U	5 U
Toluene	2 J	2 J
Tetrachloroethene	1 U	1 U
2-Hexanone	5 U	5 U
1,2-Dibromoethane	1 U	1 U
Chlorobenzene	1 U	1 U
Ethylbenzene	1 U	1 U
m-&/or p-Xylene	1 U	1 U
o-xylene	1 U	1 U
Xylenes (total)	---	---
Styrene	3 U	3 U
1,1,2,2-Tetrachloroethane	1 U	1 U
1,3-Dichlorobenzene	1 U	1 U
1,4-Dichlorobenzene	1 U	1 U
1,2-Dichlorobenzene	1 U	1 U
1,2,4-Trichlorobenzene	---	---
1,2-Dibromo-3-chloropropane	---	---
Bromochloromethane	---	---

Note: U - Constituent not detected; method detection limit (MDL) of the analysis reported.
J - Concentration reported is an estimated value.
UJ - The analyte was not detected above the reported sample quantition limit.
B - Designates the constituent was detected in the method blank.
R - The sample results are rejected due to deficiencies in the ability to analyze the sample and
--- Indicates compound not analyzed.

Table 5-2
Groundwater Analytical Results - Monitoring Wells - VOCs
Evergreen Manor, Roscoe, Illinois

Sample ID:	MW101D	MW101S	MW102D	MW102S	MW103D	MW103D-DL	MW103S	MW104D
Sample Number:	—	—	—	—	—	—	—	—
Sample Date:	8/30/00	8/30/00	8/1/00	8/1/00	8/31/00	8/31/00	8/31/00	8/2/00
Laboratory:	ESAT	ESAT	ESAT	ESAT	ESAT	ESAT	ESAT	ESAT
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
PARAMETER								
1,1,1-Trichloroethane	2 U	2 U	2 U	2 U	3 J	50 U	2 U	1 J
1,1,2,2-Tetrachloroethane	1 U	1 U	1 U	1 U	1 U	25 U	1 U	1 U
1,1,2-Trichloro-1,2,2-trifluoromethane	2 UJ	2 UJ	2 U	2 UJ	300 J	180 J	2 J	2 UJ
1,1,2-Trichloroethane	1 U	1 U	1 U	1 U	1 U	25 U	1 U	1 U
1,1-Dichloroethane	1 U	1 U	1 U	1 U	1 U	25 U	1 U	1 U
1,1-Dichloroethene	1 U	1 U	1 U	1 U	1 U	25 U	1 U	1 U
1,2,4-Trichlorobenzene	—	—	—	—	—	—	—	—
1,2-Dibromo-3-chloropropane	—	—	—	—	—	—	—	—
1,2-Dibromoethane	1 U	1 U	1 U	1 U	1 U	25 U	1 U	1 U
1,2-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	25 U	1 U	1 U
1,2-Dichloroethane	1 U	1 U	1 U	1 U	1 U	25 U	1 U	1 U
1,2-Dichloropropane	1 U	1 U	1 U	1 U	1 U	25 U	1 U	1 U
1,3-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	25 U	1 U	1 U
1,4-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	25 U	1 U	1 U
2-Butanone	11 U	11 U	11 U	11 U	11 U	250 U	11 U	11 UJ
2-Hexanone	5 U	5 U	5 U	5 U	5 U	125 U	5 U	5 U
4-Methyl-2-pentanone	5 U	5 U	5 U	5 U	5 U	125 U	5 U	5 U
Acetone	2 U	2 U	2 U	2 U	35 B	50 U	2 U	2 UJ
Benzene	1 U	1 U	1 U	1 U	1 U	25 U	1 U	1 U
Bromochloromethane	—	—	—	—	—	—	—	—
Bromodichloromethane	1 U	1 U	1 U	1 U	1 U	25 U	1 U	1 U
Bromoform	1 U	1 U	1 U	1 U	1 U	25 U	1 U	1 U
Bromomethane	1 U	1 U	1 U	1 U	1 U	25 U	1 U	1 U
Carbon Disulfide	1 U	1 U	1 U	1 U	1 U	25 U	1 U	1 U
Carbon Tetrachloride	2 U	2 U	2 U	2 U	2 U	50 U	2 U	2 U
Chlorobenzene	1 U	1 U	1 U	1 U	1 U	25 U	1 U	1 U
Chloroethane	1 U	1 U	1 U	1 U	1 U	25 U	1 U	1 U
Chloroform	3 U	3 U	3 U	3 U	3 U	75 U	3 U	3 U
Chloromethane	1 U	1 U	1 U	1 U	1 U	25 U	1 U	1 U
Cis-1,2-Dichloroethene	4 U	4 U	4 U	4 U	4 U	100 U	4 U	4 U
Cis-1,3-Dichloropropene	1 U	1 U	1 U	1 U	1 U	25 U	1 U	1 U
Dibromochloromethane	1 U	1 U	1 U	1 U	1 U	25 U	1 U	1 U
Dichlorodifluoromethane	1 U	1 U	1 U	1 U	1 U	25 U	1 U	1 U
Ethylbenzene	1 U	1 U	1 U	1 U	1 U	25 U	1 U	1 U
m-&/or p-Xylene	1 U	1 U	1 U	1 U	1 U	25 U	1 U	1 U
Methyl Acetate	1 UJ	1 UJ	1 U	1 UJ	1 UJ	25 U	1 UJ	1 UJ
Methyl tert-Butyl Ether	1 U	1 U	1 U	1 U	1 U	25 U	1 U	1 UJ
Methylene Chloride	1 U	1 U	1 U	1 U	1 U	25 U	1 U	1 U
o-xylene	1 U	1 U	1 U	1 U	1 U	25 U	1 U	1 U
Styrene	3 U	3 U	3 U	3 UJ	3 UJ	75 UJ	3 UJ	3 UJ
Tetrachloroethene	1 U	1 U	1 U	1 U	0.5 J	25 U	9 J	1 U
Toluene	1 U	1 U	1 U	1 U	1 U	25 U	1 U	1 U
Xylenes (total)	—	—	—	—	—	—	—	—
Trans-1,2-Dichloroethene	2 U	2 U	2 U	2 U	2 U	50 U	2 U	2 U
Trans-1,3-Dichloropropene	1 U	1 U	1 U	1 U	1 U	25 U	1 U	1 U
Trichloroethene	2 J	1 U	1 U	1 U	1 U	25 U	1 U	1 U
Trichlorofluoromethane	1 U	1 U	1 U	1 U	1 U	25 U	1 U	1 U
Vinyl Chloride	1 U	1 U	1 U	1 U	1 U	25 U	1 U	1 U

Table 5-2
Groundwater Analytical Results - Monitoring Wells - VOCs
Evergreen Manor, Roscoe, Illinois

Sample ID:	MW104D-DUP	MW104S	MW105D	MW105D-01	MW105S	MW108D	MW108D-01	MW108D-DUP
Sample Number:	—	—	—	EABX1	—	—	EABW8	—
Sample Date:	6/2/00	6/2/00	6/2/00	6/2/00	6/2/00	6/1/00	6/1/00	6/1/00
Laboratory:	ESAT	ESAT	ESAT	MitKem	ESAT	ESAT	MitKem	ESAT
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
PARAMETER								
1,1,1-Trichloroethane	1 J	2 J	2 J	3	2 J	2 U	1 U	2 U
1,1,2,2-Tetrachloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloro-1,2,2-trifluoromethane	2 UJ	2 UJ	2 UJ	—	2 UJ	2 UJ	—	2 UJ
1,1,2-Trichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2,4-Trichlorobenzene	—	—	—	1 U	—	—	1 U	—
1,2-Dibromo-3-chloropropane	—	—	—	1 R	—	—	1 R	—
1,2-Dibromoethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloropropane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,3-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
2-Butanone	11 UJ	11 UJ	11 UJ	5 U	11 UJ	11 U	5 U	11 U
2-Hexanone	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Methyl-2-pentanone	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Acetone	2 UJ	2 UJ	2 UJ	5 U	2 UJ	2 U	5 U	2 U
Benzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromochloromethane	—	—	—	1 U	—	—	1 U	—
Bromodichloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromoform	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromomethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Carbon Disulfide	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Carbon Tetrachloride	2 U	2 U	2 U	1 U	2 U	2 U	1 U	2 U
Chlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroform	3 U	3 U	3 U	1 U	3 U	3 U	1 U	3 U
Chloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Cis-1,2-Dichloroethene	4 U	4 U	1 J	2	1 J	4 U	1 U	4 U
Cis-1,3-Dichloropropene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Dibromochloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Dichlorodifluoromethane	1 U	1 U	1 U	—	1 U	1 U	—	1 U
Ethylbenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
m-&/or p-Xylene	1 U	1 U	1 U	—	1 U	1 U	—	1 U
Methyl Acetate	1 UJ	1 UJ	1 UJ	—	1 UJ	1 UJ	—	1 UJ
Methyl tert-Butyl Ether	1 UJ	1 UJ	1 UJ	—	1 UJ	1 U	—	1 U
Methylene Chloride	1 U	1 U	1 U	2 U	1 U	1 U	2 U	1 U
o-xylene	1 U	1 U	1 U	—	1 U	1 U	—	1 U
Styrene	3 UJ	3 UJ	3 UJ	1 U	3 UJ	3 UJ	1 U	3 UJ
Tetrachloroethene	1 U	1 U	3 J	4	3 J	0.6 J	0.7 J	0.6 J
Toluene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Xylenes (total)	—	—	—	1 U	—	—	1 U	—
Trans-1,2-Dichloroethene	2 U	2 U	2 U	1 U	2 U	2 U	1 U	2 U
Trans-1,3-Dichloropropene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichloroethene	1 U	1 U	2 J	3	2 J	1 U	1 U	1 U
Trichlorofluoromethane	1 U	1 U	1 U	—	1 U	1 U	—	1 U
Vinyl Chloride	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U

Table 5-2
Groundwater Analytical Results - Monitoring Wells - VOCs
Evergreen Manor, Roscoe, Illinois

Sample ID:	MW108S	MW110D	MW110S	MW112
Sample Number:	—	—	—	—
Sample Date:	6/1/00	6/1/00	6/1/00	6/2/00
Laboratory:	ESAT	ESAT	ESAT	ESAT
Units	ug/L	ug/L	ug/L	ug/L
PARAMETER				
1,1,1-Trichloroethane	2 U	2 U	2 U	2 J
1,1,2,2-Tetrachloroethane	1 U	1 U	1 U	1 U
1,1,2-Trichloro-1,2,2-trifluoromethane	2 UJ	2 UJ	2 UJ	2 UJ
1,1,2-Trichloroethane	1 U	1 U	1 U	1 U
1,1-Dichloroethane	1 U	1 U	1 U	1 U
1,1-Dichloroethene	1 U	1 U	1 U	1 U
1,2,4-Trichlorobenzene	—	—	—	—
1,2-Dibromo-3-chloropropane	—	—	—	—
1,2-Dibromoethane	1 U	1 U	1 U	1 U
1,2-Dichlorobenzene	1 U	1 U	1 U	1 U
1,2-Dichloroethane	1 U	1 U	1 U	1 U
1,2-Dichloropropane	1 U	1 U	1 U	1 U
1,3-Dichlorobenzene	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	1 U	1 U	1 U	1 U
2-Butanone	11 U	11 U	11 U	11 UJ
2-Hexanone	5 U	5 U	5 U	5 U
4-Methyl-2-pentanone	5 U	5 U	5 U	5 U
Acetone	2 U	2 U	2 U	2 UJ
Benzene	1 U	1 U	1 U	1 U
Bromochloromethane	—	—	—	—
Bromodichloromethane	1 U	1 U	1 U	1 U
Bromoform	1 U	1 U	1 U	1 U
Bromomethane	1 U	1 U	1 U	1 U
Carbon Disulfide	1 U	1 U	1 U	1 U
Carbon Tetrachloride	2 U	2 U	2 U	2 U
Chlorobenzene	1 U	1 U	1 U	1 U
Chloroethane	1 U	1 U	1 U	1 U
Chloroform	3 U	3 U	3 U	3 U
Chloromethane	1 U	1 U	1 U	1 U
Cis-1,2-Dichloroethene	4 U	4 U	4 U	4 U
Cis-1,3-Dichloropropene	1 U	1 U	1 U	1 U
Dibromochloromethane	1 U	1 U	1 U	1 U
Dichlorodifluoromethane	1 U	1 U	1 U	1 U
Ethylbenzene	1 U	1 U	1 U	1 U
m-&/or p-Xylene	1 U	1 U	1 U	1 U
Methyl Acetate	1 UJ	1 UJ	1 UJ	1 UJ
Methyl tert-Butyl Ether	1 U	1 U	1 U	1 UJ
Methylene Chloride	1 U	1 U	1 U	1 U
o-xylene	1 U	1 U	1 U	1 U
Styrene	3 UJ	3 UJ	3 UJ	3 UJ
Tetrachloroethene	1 U	1 U	1 U	1 U
Toluene	1 U	1 U	1 U	1 U
Xylenes (total)	—	—	—	—
Trans-1,2-Dichloroethene	2 U	2 U	2 U	2 U
Trans-1,3-Dichloropropene	1 U	1 U	1 U	1 U
Trichloroethene	1 U	1 U	1 U	1 U
Trichlorofluoromethane	1 U	1 U	1 U	1 U
Vinyl Chloride	1 U	1 U	1 U	1 U

U - Constituent not detected; method detection limit (MDL) of the analysis is reported.

J - Concentration reported is an estimated value.

UJ - The analyte was not detected above the reported sample quantitation limit.

DL - Designetes sample was diluted.

B - Designates the constituent was detected in the method blank.

— Indicates compound not analyzed.

Table 5-3
Groundwater Analytical Results - Monitoring Wells- Water Quality Parameters
Evergreen Manor, Roscoe, Illinois

Sample ID:	MW101D-01	MW102D-01	MW103D-01	MW104D-01	MW106D-01	MW108D-01	MW108D-01DP	MW110D-01	MW112-01
Sample Number:	S07	S11	S08	S15	S14	S12	D12	S13	S16
Sample Date:	5/30/00	6/1/00	5/30/00	6/2/00	6/2/00	6/1/00	6/1/00	6/1/00	6/2/00
Laboratory:	CHEMTECH	CHEMTECH	CHEMTECH	CHEMTECH	CHEMTECH	CHEMTECH	CHEMTECH	CHEMTECH	CHEMTECH
Units:	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Parameter:									
Chemical Oxygen Demand	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	10
Nitrogen, Ammonia	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Nitrogen, Nitrite	7.8	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Nitrogen, Nitrate	7.7	5.8	7.5	5.4	4.5	8.3	8.5	6.6	3.3
Ortho Phosphate	0.025	<0.01	0.69	0.016	<0.01	<0.01	0.011	0.014	0.031
Total Sulfide	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Sulfate	27	15	22	25	25	25	22	24	22
Field Measurements									
Dissolved Oxygen	6.02	6.95	6.09	—	2.77	5.57	5.57	5.88	7.61
Ferrous Iron	0.0	0.0	0.0	—	0.0	0.0	0.0	0.0	0.0
Units:	mV	mV	mV	mV	mV	mV	mV	mV	mV
Oxidation/Reduction Potential	137	84	28	213	149	174	174	136	167

Table 5-4
Groundwater Analytical Results - Residential Wells - VOCs
Evergreen Manor, Roscoe, Illinois

Sample ID:	RW01-01	RW02-01	RW-03	RW-04	RW04-01	RW-05	RW-05DUP	RW-06
Sample Number:	—	—	—	—	EABQ4	—	—	—
Sample Date:	5/31/00	5/31/00	6/5/00	6/5/00	6/5/00	6/5/00	6/5/00	6/5/00
Address:	12023 Tresemer	12009 Tresemer	11990 Wagon Ln.	11990 Blue Spruce	11990 Blue Spruce	4514 Straw Ln.	4514 Straw Ln.	4532 Straw Ln.
Laboratory:	ESAT	ESAT	ESAT	ESAT	MITKEM	ESAT	ESAT	ESAT
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
PARAMETER								
1,1,1-Trichloroethane	2 U	2 U	2 J	2 J	2	2 U	2 U	2 U
1,1,2,2-Tetrachloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloro-1,2,2-trifluoromethane	2 UJ	2 UJ	2 U	2 U	—	2 U	2 U	2 U
1,1,2-Trichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2,4-Trichlorobenzene	—	—	—	—	1 U	—	—	—
1,2-Dibromo-3-chloropropane	—	—	—	—	1 R	—	—	—
1,2-Dibromoethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	1 U	1 U	1 U	1 U	1 UJ	1 U	1 U	1 U
1,2-Dichloropropane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,3-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
2-Butanone	11 U	11 U	11 U	11 U	5 U	11 U	11 U	11 U
2-Hexanone	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Methyl-2-pentanone	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Acetone	2 U	2 U	0.8	2 U	5 U	2 U	0.6	2 U
Benzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromochloromethane	—	—	—	—	1 U	—	—	—
Bromodichloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromoform	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromomethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Carbon Disulfide	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Carbon Tetrachloride	2 U	2 U	2 U	2 U	—	2 U	2 U	2 U
Chlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroform	3 U	3 U	3 U	3 U	1 U	3 U	3 U	3 U
Chloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Cis-1,2-Dichloroethene	4 U	4 U	4 U	1 J	2	4 U	4 U	4 U
Cis-1,3-Dichloropropene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Dibromochloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Dichlorodifluoromethane	1 U	1 U	1 U	1 U	—	1 U	1 U	1 U
Ethylbenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
m-&/or p-Xylene	1 U	1 U	1 U	1 U	—	1 U	1 U	1 U
Methyl Acetate	1 UJ	1 UJ	1 UJ	1 UJ	—	1 UJ	1 UJ	1 UJ
Methyl tert-Butyl Ether	1 U	1 U	1 U	1 U	—	1 U	1 U	1 U
Methylene Chloride	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U
o-xylene	1 U	1 U	1 U	1 U	—	1 U	1 U	1 U
Styrene	3 UJ	3 UJ	3 U	3 U	1 U	3 U	3 U	3 U
Tetrachloroethene	1 U	1 U	1 U	2 J	2	1 U	1 U	1 U
Toluene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Xylenes (total)	—	—	—	—	1 U	—	—	—
Trans-1,2-Dichloroethene	2 U	2 U	2 U	2 U	1 U	2 U	2 U	2 U
Trans-1,3-Dichloropropene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichloroethene	1 U	1 U	1 U	5 J	6	1 U	1 U	1 U
Trichlorofluoromethane	1 U	1 U	1 U	1 U	—	1 U	1 U	1 U
Vinyl Chloride	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U

Table 5-4
Groundwater Analytical Results - Residential Wells - VOCs
Evergreen Manor, Roscoe, Illinois

Sample ID:	RW-07	RW-08	RW-09	RW-10	RW-11	RW11-01	RW11-01DP	RW-11DUP
Sample Number:	—	—	—	—	—	EABQ5	EABQ6	—
Sample Date:	6/5/00	6/5/00	6/5/00	6/5/00	6/5/00	6/5/00	6/5/00	6/5/00
Address:	12031 Wagon Ln. Ct.	11943 Wagon Ln.	4134 Valerie Dr.	4158 Valerie Dr.	4234 Valerie Dr.	4234 Valerie Dr.	4234 Valerie Dr.	4234 Valerie Dr.
Laboratory:	ESAT	ESAT	ESAT	ESAT	ESAT	MITKEM	MITKEM	ESAT
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
PARAMETER								
1,1,1-Trichloroethane	5 J	0.9 J	2 U	2 U	1 J	1	1	1 J
1,1,2,2-Tetrachloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloro-1,2,2-trifluoromethane	2 U	2 U	2 U	2 U	2 U	—	—	2 U
1,1,2-Trichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2,4-Trichlorobenzene	—	—	—	—	—	1 U	1 U	—
1,2-Dibromo-3-chloropropane	—	—	—	—	—	1 R	1 R	—
1,2-Dibromoethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	1 U	1 U	1 U	1 U	1 U	1 UJ	1 U	1 U
1,2-Dichloropropane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,3-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
2-Butanone	11 U	11 U	11 U	11 U	11 U	5 U	5 U	11 U
2-Hexanone	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Methyl-2-pentanone	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Acetone	2 U	2 U	2 U	2 U	2 U	5 U	5 U	2 U
Benzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromochloromethane	—	—	—	—	—	1 U	1 U	—
Bromodichloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromoform	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromomethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Carbon Disulfide	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Carbon Tetrachloride	2 U	2 U	2 U	2 U	2 U	—	—	2 U
Chlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroform	3 U	0.9 J	3 U	3 U	3 U	1 U	1 U	3 U
Chloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Cis-1,2-Dichloroethene	4 U	4 U	4 U	4 U	4 U	1 U	1 U	4 U
Cis-1,3-Dichloropropene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Dibromochloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Dichlorodifluoromethane	1 U	1 U	1 U	1 U	1 U	—	—	1 U
Ethylbenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
m-&/or p-Xylene	1 U	1 U	1 U	1 U	1 U	—	—	1 U
Methyl Acetate	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	—	—	1 UJ
Methyl tert-Butyl Ether	1 U	1 U	1 U	1 U	1 U	—	—	1 U
Methylene Chloride	1 U	1 U	1 U	1 U	1 U	2 U	2 U	1 U
o-xylene	1 U	1 U	1 U	1 U	1 U	—	—	1 U
Styrene	3 U	3 U	3 U	3 U	3 U	1 U	1 U	3 U
Tetrachloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Toluene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Xylenes (total)	—	—	—	—	—	1 U	1 U	—
Trans-1,2-Dichloroethene	2 U	2 U	2 U	2 U	2 U	1 U	1 U	2 U
Trans-1,3-Dichloropropene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichloroethene	0.7 J	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichlorofluoromethane	1 U	1 U	1 U	1 U	1 U	—	—	1 U
Vinyl Chloride	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U

Table 5-4
Groundwater Analytical Results - Residential Wells - VOCs
Evergreen Manor, Roscoe, Illinois

Sample ID:	RW-12	RW-13	RW-14	RW-15	RW-16	RW-17	RW-18	RW-19
Sample Number:	—	—	—	—	—	—	—	—
Sample Date:	6/5/00	6/6/00	6/6/00	6/6/00	6/6/00	6/6/00	6/6/00	6/6/00
Address:	4176 Valerie Dr.	4684 Straw Ln.	4628 Straw Ln.	4606 Straw Ln.	4570 Straw Ln.	4246 Hononegah	4232 Hononegah	11974 Blue Spruce Dr.
Laboratory:	ESAT	ESAT	ESAT	ESAT	ESAT	ESAT	ESAT	ESAT
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
PARAMETER								
1,1,1-Trichloroethane	2 U	2 U	2 U	2 U	2 U	2 U	2 U	1 J
1,1,2,2-Tetrachloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloro-1,2,2-trifluoromethane	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
1,1,2-Trichloroethane	1 U	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
1,1-Dichloroethane	1 U	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
1,1-Dichloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2,4-Trichlorobenzene	—	—	—	—	—	—	—	—
1,2-Dibromo-3-chloropropane	—	—	—	—	—	—	—	—
1,2-Dibromoethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloropropane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,3-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
2-Butanone	11 U	11 UJ	11 UJ	11 UJ	11 UJ	11 UJ	11 UJ	11 UJ
2-Hexanone	5 U	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ
4-Methyl-2-pentanone	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Acetone	2 U	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ
Benzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromochloromethane	—	—	—	—	—	—	—	—
Bromodichloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromoform	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromomethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Carbon Disulfide	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Carbon Tetrachloride	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Chlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroform	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
Chloromethane	1 U	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
Cis-1,2-Dichloroethene	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U
Cis-1,3-Dichloropropene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Dibromochloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Dichlorodifluoromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Ethylbenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
m-&/or p-Xylene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methyl Acetate	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
Methyl tert-Butyl Ether	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methylene Chloride	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
o-xylene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Styrene	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
Tetrachloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.9 J
Toluene	1 U	2 B	2 B	2 B	1 U	2 B	2 B	1 B
Xylenes (total)	—	—	—	—	—	—	—	—
Trans-1,2-Dichloroethene	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Trans-1,3-Dichloropropene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	4 J
Trichlorofluoromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Vinyl Chloride	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U

Table 5-4
Groundwater Analytical Results - Residential Wells - VOCs
Evergreen Manor, Roscoe, Illinois

Sample ID:	RW-19DUP	RW-20	RW-21	RW-22
Sample Number:	—	—	—	—
Sample Date:	6/6/00	6/6/00	6/6/00	6/6/00
Address:	11974 Blue Spruce Dr.	12055 Tresemer	11951 Tresemer	12031 Tresemer
Laboratory:	ESAT	ESAT	ESAT	ESAT
Units	ug/L	ug/L	ug/L	ug/L
PARAMETER				
1,1,1-Trichloroethane	0.6 J	2 U	2 U	2 U
1,1,2,2-Tetrachloroethane	1 U	1 U	1 U	1 U
1,1,2-Trichloro-1,2,2-trifluoromethane	2 U	2 U	2 U	2 U
1,1,2-Trichloroethane	1 UJ	1 UJ	1 UJ	1 UJ
1,1-Dichloroethane	1 UJ	1 UJ	1 UJ	1 UJ
1,1-Dichloroethene	1 U	1 U	1 U	1 U
1,2,4-Trichlorobenzene	—	—	—	—
1,2-Dibromo-3-chloropropane	—	—	—	—
1,2-Dibromoethane	1 U	1 U	1 U	1 U
1,2-Dichlorobenzene	1 U	1 U	1 U	1 U
1,2-Dichloroethane	1 U	1 U	1 U	1 U
1,2-Dichloropropane	1 U	1 U	1 U	1 U
1,3-Dichlorobenzene	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	1 U	1 U	1 U	1 U
2-Butanone	11 UJ	11 UJ	11 UJ	11 UJ
2-Hexanone	5 UJ	5 UJ	5 UJ	5 UJ
4-Methyl-2-pentanone	5 U	5 U	5 U	5 U
Acetone	2 UJ	2 UJ	2 UJ	2 UJ
Benzene	1 U	1 U	1 U	1 U
Bromochloromethane	—	—	—	—
Bromodichloromethane	1 U	1 U	1 U	1 U
Bromoform	1 U	1 U	1 U	1 U
Bromomethane	1 U	1 U	1 U	1 U
Carbon Disulfide	1 U	1 U	1 U	1 U
Carbon Tetrachloride	2 U	2 U	2 U	2 U
Chlorobenzene	1 U	1 U	1 U	1 U
Chloroethane	1 U	1 U	1 U	1 U
Chloroform	3 U	3 U	3 U	3 U
Chloromethane	1 UJ	1 UJ	1 UJ	1 UJ
Cis-1,2-Dichloroethene	4 U	4 U	4 U	4 U
Cis-1,3-Dichloropropene	1 U	1 U	1 U	1 U
Dibromochloromethane	1 U	1 U	1 U	1 U
Dichlorodifluoromethane	1 U	1 U	1 U	1 U
Ethylbenzene	1 U	1 U	1 U	1 U
m-&/or p-Xylene	1 U	1 U	1 U	1 U
Methyl Acetate	1 UJ	1 UJ	1 UJ	1 UJ
Methyl tert-Butyl Ether	1 U	1 U	1 U	1 U
Methylene Chloride	1 U	1 U	1 U	1 U
o-xylene	1 U	1 U	1 U	1 U
Styrene	3 U	3 U	3 U	3 U
Tetrachloroethene	0.9 J	1 U	1 U	1 U
Toluene	2 B	1 B	1 B	2 B
Xylenes (total)	—	—	—	—
Trans-1,2-Dichloroethene	2 U	2 U	2 U	2 U
Trans-1,3-Dichloropropene	1 U	1 U	1 U	1 U
Trichloroethene	4 J	1 U	1 U	1 U
Trichlorofluoromethane	1 U	1 U	1 U	1 U
Vinyl Chloride	1 U	1 U	1 U	1 U

U - Constituent not detected; method detection limit (MDL) of the analysis reported.

J - Concentration reported is an estimated value.

UJ - The analyte was not detected above the reported sample quantition limit.

B - Designates the constituent was detected in the method blank.

--- Indicates compound not analyzed.

Table 5-5
Groundwater Analytical Results - Residential Wells - Water Quality Parameters
Evergreen Manor, Roscoe, Illinois

Sample ID:	RW01-01	RW01-01DP	RW02-01	RW03-01	RW04-01	RW05-01	RW07-01
Sample Number:	S10	D10	S09	S17	S18	S19	S20
Sample Date:	5/31/00	5/31/00	5/31/00	6/5/00	6/5/00	6/5/00	6/5/00
Laboratory:	CHEMTECH	CHEMTECH	CHEMTECH	CHEMTECH	CHEMTECH	CHEMTECH	CHEMTECH
Units:	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Parameter:							
Chemical Oxygen Demand	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Nitrogen, Ammonia	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Nitrogen, Nitrite	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Nitrogen, Nitrate	4.4	4.2	3.9	6.2	6.3	4.4	5.5
Ortho Phosphate	0.048	0.051	0.048	0.051	0.031	0.038	0.029
Total Sulfide	<1.0	<1.0	<1.0	2.4	1.6	<1.0	<1.0
Sulfate	22	27	24	22	19	26	28
Field Measurements							
Dissolved Oxygen	7.03	7.03	7.17	7.70	5.36	5.60	5.39
Ferrous Iron	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Units:	mV	mV	mV	mV	mV	mV	mV
Oxidation/Reduction Potential	88	88	88	222	209	165	176

Table 5-6
Sediment Analytical Results - VOCs
Evergreen Manor, Roscoe, Illinois

Sample ID:	SD01-01	SD01-01DUP	SD02-01	SD03-01	SD04-01	SD04-01	SD04-01DP
Sample Number:	—	—	—	—	—	EABQ9	EABR1
Sample Date:	5/24/00	5/24/00	5/23/00	5/23/00	5/24/00	5/24/00	5/24/00
Laboratory:	ESAT	ESAT	ESAT	ESAT	ESAT	DATACHEM	DATACHEM
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
PARAMETER							
1,1,1-Trichloroethane	25 U	25 U	25 U	25 U	25 U	12 U	12 U
1,1,2,2-Tetrachloroethane	5 U	5 U	5 U	5 U	5 U	12 U	12 U
1,1,2-Trichloro-1,2,2-trifluoromethane	5 U	5 U	5 U	5 U	5 U	12 U	12 U
1,1,2-Trichloroethane	5 U	5 U	5 U	5 U	5 U	12 U	12 U
1,1-Dichloroethane	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	12 U	12 U
1,1-Dichloroethene	5 U	5 U	5 U	5 U	5 U	12 U	12 U
1,2,4-trichlorobenzene	—	—	—	—	—	—	—
1,2-Dibromo-3-chloropropane	—	—	—	—	—	12 U	12 U
1,2-Dibromoethane	5 U	5 U	5 U	5 U	5 U	12 UJ	12 UJ
1,2-Dichlorobenzene	5 U	5 U	5 U	5 U	5 U	12 U	12 U
1,2-Dichloroethane	5 U	5 U	5 U	5 U	5 U	12 U	12 U
1,2-Dichloropropane	5 U	5 U	5 U	5 U	5 U	12 U	12 U
1,3-Dichlorobenzene	5 U	5 U	5 U	5 U	5 U	12 U	12 U
1,4-Dichlorobenzene	5 U	5 U	5 U	5 U	5 U	12 U	12 U
2-Butanone	25 U	25 U	25 U	25 U	25 U	12 U	12 U
2-Hexanone	25 U	25 U	25 U	25 U	25 U	12 U	12 U
4-Methyl-2-pentanone	25 U	25 U	25 U	25 U	25 U	12 U	12 U
Acetone	25 U	25 U	25 U	25 U	25 U	12 U	12 U
Benzene	5 U	5 U	5 U	5 U	5 U	12 U	2 J
Bromodichloromethane	5 U	5 U	5 U	5 U	5 U	12 U	12 U
Bromoform	5 U	5 U	5 U	5 U	5 U	12 U	12 U
Bromomethane	20 UJ	20 UJ	20 UJ	20 UJ	20 UJ	12 U	12 U
Carbon Disulfide	5 U	5 U	5 U	5 U	5 U	12 U	12 U
Carbon Tetrachloride	5 U	5 U	5 U	5 U	5 U	12 U	12 U
Chlorobenzene	5 U	5 U	5 U	5 U	5 U	12 U	12 U
Chloroethane	10 U	10 U	10 U	10 U	10 U	—	—
Chloroform	8 J	50 UJ	50 UJ	50 UJ	50 UJ	12 U	12 U
Chloromethane	5 U	5 U	5 U	5 U	5 U	12 U	12 U
Cis-1,2-Dichloroethene	25 U	25 U	25 U	25 U	25 U	12 U	12 U
Cis-1,3-Dichloropropene	5 U	5 U	5 U	5 U	5 U	12 U	12 U
Cyclohexane	—	—	—	—	—	12 U	12 U
Dibromochloromethane	5 U	5 U	5 U	5 U	5 U	12 U	12 U
Dichlorodifluoromethane	5 U	5 U	5 U	5 U	5 U	12 U	12 U
Ethylbenzene	5 U	5 U	5 U	5 U	5 U	12 U	12 U
Isopropylbenzene	—	—	—	—	—	12 U	12 U
m-&/or p-Xylene	5 U	5 U	5 U	5 U	5 U	—	—
Methyl Acetate	5 J	15 U	9 J	15 U	15 U	12 U	12 U
Methyl tert-Butyl Ether	25 U	25 U	25 U	25 U	25 U	12 U	12 U
Methylcyclohexane	—	—	—	—	—	12 U	12 U
Methylene Chloride	10 U	10 U	10 U	10 U	10 U	12 U	12 U
o-xylene	5 U	5 U	5 U	5 U	5 U	—	—
Styrene	5 U	5 U	5 U	5 U	5 U	12 U	12 U
Tetrachloroethene	5 U	5 U	5 U	5 U	5 U	12 U	12 U
Toluene	5 U	5 U	5 U	5 U	5 U	12 U	0.7 J
Trans-1,2-Dichloroethene	50 U	50 U	50 U	50 U	50 U	12 U	12 U
Trans-1,3-Dichloropropene	5 U	5 U	5 U	5 U	5 U	12 U	12 U
Trichloroethene	5 U	5 U	5 U	5 U	5 U	12 U	12 U
Trichlorofluoromethane	5 U	5 U	5 U	5 U	5 U	12 U	12 U
Vinyl Chloride	15 UJ	15 UJ	15 UJ	15 UJ	15 UJ	12 U	12 U
Xylenes (total)	—	—	—	—	—	12 U	12 U

Table 5-6
Sediment Analytical Results - VOCs
Evergreen Manor, Roscoe, Illinois

Sample ID:	SD05-01	SD06-01
Sample Number:	—	—
Sample Date:	5/24/00	5/23/00
Laboratory:	ESAT	ESAT
Units	ug/kg	ug/kg
PARAMETER		
1,1,1-Trichloroethane	25 U	25 U
1,1,2,2-Tetrachloroethane	5 U	5 U
1,1,2-Trichloro-1,2,2-trifluoromethane	5 U	5 U
1,1,2-Trichloroethane	5 U	5 U
1,1-Dichloroethane	10 UJ	10 UJ
1,1-Dichloroethene	5 U	5 U
1,2,4-trichlorobenzene	—	—
1,2-Dibromo-3-chloropropane	—	—
1,2-Dibromoethane	5 U	5 U
1,2-Dichlorobenzene	5 U	5 U
1,2-Dichloroethane	5 U	5 U
1,2-Dichloropropane	5 U	5 U
1,3-Dichlorobenzene	5 U	5 U
1,4-Dichlorobenzene	5 U	5 U
2-Butanone	25 U	25 U
2-Hexanone	25 U	25 U
4-Methyl-2-pentanone	25 U	25 U
Acetone	25 U	25 U
Benzene	5 U	5 U
Bromodichloromethane	5 U	5 U
Bromoform	5 U	5 U
Bromomethane	20 UJ	20 UJ
Carbon Disulfide	5 U	5 U
Carbon Tetrachloride	5 U	5 U
Chlorobenzene	5 U	5 U
Chloroethane	10 U	10 U
Chloroform	50 UJ	50 UJ
Chloromethane	5 U	5 U
Cis-1,2-Dichloroethene	25 U	25 U
Cis-1,3-Dichloropropene	5 U	5 U
Cyclohexane	—	—
Dibromochloromethane	5 U	5 U
Dichlorodifluoromethane	5 U	5 U
Ethylbenzene	5 U	5 U
Isopropylbenzene	—	—
m-&/or p-Xylene	5 U	5 U
Methyl Acetate	9 J	15 U
Methyl tert-Butyl Ether	25 U	25 U
Methylcyclohexane	—	—
Methylene Chloride	10 U	10 U
o-xylene	5 U	5 U
Styrene	5 U	5 U
Tetrachloroethene	5 U	5 U
Toluene	5 U	5 U
Trans-1,2-Dichloroethene	50 U	50 U
Trans-1,3-Dichloropropene	5 U	5 U
Trichloroethene	5 U	5 U
Trichlorofluoromethane	5 U	5 U
Vinyl Chloride	15 UJ	15 UJ
Xylenes (total)	—	—

U - Constituent not detected; method detection limit (MDL) of the analysis reported.
J - Concentration reported is an estimated value.
UJ - The analyte was not detected above the reported sample quantition limit.
--- Indicates compound not analyzed.

Table 5-7
Sediment Analytical Results- Total Organic Carbon
Evergreen Manor, Roscoe, Illinois

Sample ID:	SD01-01	SD02-01	SD03-01	SD04-01	SD05-01	SD06-01	SD06-01DP
Sample Number:	S03	S02	S01	S06	S05	S04	D01
Sample Date:	5/23/00	5/23/00	5/23/00	5/24/00	5/24/00	5/23/00	5/23/00
Laboratory:	CHEMTECH	CHEMTECH	CHEMTECH	CHEMTECH	CHEMTECH	CHEMTECH	CHEMTECH
Units:	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Parameter:							
Total Organic Carbon	30000	17000	11000	4200	24000	4700	5000

Table 5-8
Surface Water Analytical Results - VOCs
Evergreen Manor, Roscoe, Illinois

Sample ID:	SW01-01	SW01-01DUP	SW02-01	SW03-01	SW04-01	SW04-01
Sample Number:	—	—	—	—	—	EABW2
Sample Date:	5/23/00	5/23/00	5/23/00	5/23/00	5/23/00	5/29/00
Laboratory:	ESAT	ESAT	ESAT	ESAT	ESAT	MitKem
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
PARAMETER						
1,1,1-Trichloroethane	2 U	2 U	2 U	2 U	2 U	1 U
1,1,2,2-Tetrachloroethane	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 U
1,1,2-Trichloro-1,2,2-trifluoromethane	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ	—
1,1,2-Trichloroethane	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethane	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethene	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 U
1,2,4-trichlorobenzene	—	—	—	—	—	1 U
1,2-dibromo-3-chloropropane	—	—	—	—	—	1 R
1,2-Dibromoethane	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	1 U	1 U	1 U	1 U	1 U	1 UJ
1,2-Dichloropropane	1 U	1 U	1 U	1 U	1 U	1 U
1,3-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U
2-Butanone	11 U	11 U	11 U	11 U	11 U	5 U
2-Hexanone	5 U	5 U	5 U	5 U	5 U	5 U
4-Methyl-2-pentanone	5 U	5 U	5 U	5 U	5 U	5 U
Acetone	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ	5 U
Benzene	1 U	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	1 U	1 U	1 U	1 U	1 U	1 U
Bromoform	1 U	1 U	1 U	1 U	1 U	1 U
Bromomethane	1 U	1 U	1 U	1 U	1 U	1 U
Carbon Disulfide	1 U	1 U	1 U	1 U	1 U	1 U
Carbon Tetrachloride	2 U	2 U	2 U	2 U	2 U	1 U
Chlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U
Chloroethane	1 U	1 U	1 U	1 U	1 U	1 U
Chloroform	3 U	3 U	3 U	3 U	3 U	1 U
Chloromethane	1 U	1 U	1 U	1 U	1 U	1 U
Cis-1,2-Dichloroethene	4 U	4 U	4 U	4 U	4 U	1 U
Cis-1,3-Dichloropropene	1 U	1 U	1 U	1 U	1 U	1 U
Dibromochloromethane	1 U	1 U	1 U	1 U	1 U	1 U
Dichlorodifluoromethane	1 U	1 U	1 U	1 U	1 U	—
Ethylbenzene	1 U	1 U	1 U	1 U	1 U	1 U
m-&/or p-Xylene	1 U	1 U	1 U	1 U	1 U	—
Methyl Acetate	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	—
Methyl tert-Butyl Ether	1 U	1 U	1 U	1 U	1 U	—
Methylene Chloride	1 U	1 U	1 U	1 U	1 U	2 U
o-xylene	1 U	1 U	1 U	1 U	1 U	—
Styrene	3 U	3 U	3 U	3 U	3 U	1 U
Tetrachloroethene	1 U	1 U	1 U	1 U	1 U	1 U
Toluene	1 U	1 U	1 U	1 U	1 U	1 U
Trans-1,2-Dichloroethene	2 U	2 U	2 U	2 U	2 U	1 U
Trans-1,3-Dichloropropene	1 U	1 U	1 U	1 U	1 U	1 U
Trichloroethene	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 U
Trichlorofluoromethane	1 U	1 U	1 U	1 U	1 U	—
Vinyl Chloride	1 U	1 U	1 U	1 U	1 U	1 U
Xylenes (total)	—	—	—	—	—	1 U

Table 5-8
Surface Water Analytical Results - VOCs
Evergreen Manor, Roscoe, Illinois

Sample ID:	SW04-01DP	SW06-01
Sample Number:	EABW1	—
Sample Date:	5/29/00	5/23/00
Laboratory:	MittKem	ESAT
Units	ug/L	ug/L
PARAMETER		
1,1,1-Trichloroethane	1 U	2 U
1,1,2,2-Tetrachloroethane	1 U	1 UJ
1,1,2-Trichloro-1,2,2-trifluoromethane	—	2 UJ
1,1,2-Trichloroethane	1 U	1 U
1,1-Dichloroethane	1 U	1 U
1,1-Dichloroethene	1 U	1 UJ
1,2,4-trichlorobenzene	1 U	—
1,2-dibromo-3-chloropropane	1 R	—
1,2-Dibromoethane	1 U	1 U
1,2-Dichlorobenzene	1 U	1 U
1,2-Dichloroethane	1 UJ	1 U
1,2-Dichloropropane	1 U	1 U
1,3-Dichlorobenzene	1 U	1 U
1,4-Dichlorobenzene	1 U	1 U
2-Butanone	5 U	11 U
2-Hexanone	5 U	5 U
4-Methyl-2-pentanone	5 U	5 U
Acetone	5 U	2 UJ
Benzene	1 U	1 U
Bromodichloromethane	1 U	1 U
Bromoform	1 U	1 U
Bromomethane	1 U	1 U
Carbon Disulfide	1 U	1 U
Carbon Tetrachloride	1 U	2 U
Chlorobenzene	1 U	1 U
Chloroethane	1 U	1 U
Chloroform	1 U	3 U
Chloromethane	1 U	1 U
Cis-1,2-Dichloroethene	1 U	4 U
Cis-1,3-Dichloropropene	1 U	1 U
Dibromochloromethane	1 U	1 U
Dichlorodifluoromethane	—	1 U
Ethylbenzene	1 U	1 U
m-&/or p-Xylene	—	1 U
Methyl Acetate	—	1 UJ
Methyl tert-Butyl Ether	—	1 U
Methylene Chloride	2 U	1 U
o-xylene	—	1 U
Styrene	1 U	3 U
Tetrachloroethene	1 U	1 U
Toluene	1 U	1 U
Trans-1,2-Dichloroethene	1 U	2 U
Trans-1,3-Dichloropropene	1 U	1 U
Trichloroethene	1 U	1 UJ
Trichlorofluoromethane	—	1 U
Vinyl Chloride	1 U	1 U
Xylenes (total)	1 U	—

U - Constituent not detected; method detection limit (MDL) of the analysis is reported.

J - Concentration reported is an estimated value.

R - The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria.

UJ - The analyte was not detected above the reported sample quantitation limit.

--- Indicates compound not analyzed.

SECTION 6

GEOLOGIC AND HYDROGEOLOGIC INVESTIGATION RESULTS

This section presents the site geology, site hydrogeology, and site hydrology based on the RI results, review of existing documents, and data from previous investigations at the site.

6.1 SITE GEOLOGY

The geology of the site is characterized by surficial deposits of fill and topsoil, overlying glaciofluvial outwash deposits of sand and gravel. A total of 10 locations were investigated using CPT. Refusal was reached at a depth of 10 to 15 feet below grade at three of these locations. The remaining seven locations were advanced to depths greater than approximately 90 feet. The following sub-section describes the lithology based on the CPT results.

6.1.1 CPT Interpretation

The CPT results included the end-bearing resistance, friction along the side of the probe, friction ratio, and electrical conductivity. Each of these results is plotted on a CPT log in relation to depth. The logs from each of the CPT locations are presented in Appendix E. In several instances, shallow refusal was encountered and subsequent CPT advances at the same location were identified alphabetically (e.g., CPT07, CPT07A, CPT07B, etc.). Refusal was encountered a number of times, and at locations CPT07, CPT08, and CPT13, the probe could not be advanced past a depth of 10 to 15 feet. CPT was not conducted at locations CPT09, CPT10, and CPT12 due to their proximity to nearby locations which were logged for stratigraphy data.

Most of the borings were advanced along roadways and through some thickness of fill or reworked material. This is seen on the logs as a more clay-rich zone extending to depths from about 1 to 10

feet below grade. The fill is identified on the logs as having a lower end-bearing resistance (tip resistance), and a higher friction ratio. Underlying the fill is sand and gravel, with localized zones containing greater amounts of silt.

Several subtle patterns within the sand and gravel were discernible from the CPT logs. In general, the uppermost portion of the sand and gravel consisted of a zone with an abundance of dense gravel. This is based on the tip resistance, which exceeded 300 tons per square foot (tsf) and frequently went off the scale presented on the logs (>450 tsf). Although there was evidence of concrete fill material in the vicinity of CPT07, CPT08, and CPT13, it is possible that this gravelly zone was the cause of the shallow refusal at each of these locations.

Underlying the dense gravelly zone, is a zone that has been interpreted as a clean, well graded sand. This zone is best seen on the logs from CPT05 and CPT06. At these locations, at depths of 16 to 20 feet below grade, the tip resistance is generally less than 150 tsf and the friction ratio is approximately 1%. The tip resistance also lacks any sharp peaks that would indicate the presence of gravels or cobbles. It is also possible that this is a coarsening downwards sequence as evidenced by a gradual increase in the end-bearing resistance. This zone is either absent or not as well graded at locations CPT01 through CPT03, which are the southern-most CPT locations at the site.

The remainder of the lithology can be described as sand and gravel, with varying amounts of gravel. A slight increase in the fines content (probably silt) is apparent at depths below approximately 70 feet below grade. This increase in fines is also associated with an increase in the gravel content.

The above interpretations were correlated with the available boring logs from the IEPA installed monitoring wells. Transects of three cross sections are shown on Figure 6-1, and the cross sections showing the interpreted correlation through the site are presented as Figures 6-2 through 6-4. These cross sections show that the subsurface consists predominantly of sand. Variations in the subsurface

are due to the amount of gravel present, by the presence of localized silt seams, and by the relatively higher silt content at certain depths. Low permeability silt/clay layers were not encountered in the subsurface.

6.2 SITE HYDROGEOLOGY

The hydrogeology at the Evergreen Manor site is that of an extensive unconfined sand and gravel outwash aquifer. Groundwater elevations were found to be consistently the same in shallow and deep clustered wells, and varied in elevation between 722 and 735 feet above MSL. Groundwater flow at the site is from the northeast to the southwest toward the Rock River, as shown on Figure 6-5. The Rock River is presumed to be the groundwater discharge location. The gradient across the site is fairly uniform and based on the contours shown on Figure 6-5 is approximately 0.0015 ft/ft.

Hydraulic conductivity test results were conducted in the 1980's by the Illinois Department of Energy and Natural Resources. Pressure tests were conducted at four well clusters, at depths between 40 and 80 feet below grade, and an average hydraulic conductivity of 3.8×10^{-2} cm/sec was found (Wehrmann, 1984).

Using hydraulic conductivity estimates, groundwater gradient, and effective porosity estimates, an average linear flow velocity for groundwater in the shallow unconfined alluvial aquifer was estimated in accordance with Darcy's Law as follows:

$$v = \frac{Ki}{n_e}$$

Where:

v = Linear groundwater seepage velocity (cm/sec)
K = Hydraulic conductivity (cm/sec)

i = Horizontal hydraulic gradient (ft/ft)
n_e = Effective porosity

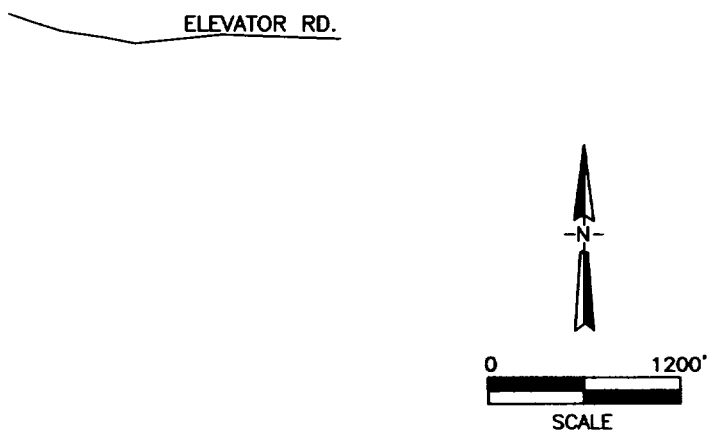
Using a hydraulic conductivity value of 3.8×10^{-2} cm/sec, a gradient of 0.0015 ft/ft, and an estimated effective porosity of 30% for sand and gravel mixtures (Fetter, 1994), an average linear groundwater flow velocity of 1.9×10^{-4} cm/sec (0.54 ft/day) was estimated.

6.3 SITE HYDROLOGY

The surface water bodies on the site include Dry Creek and the Rock River. Dry Creek is the only drainageway that traverses a portion of the site and ultimately flows into the Rock River. The Rock River is the southern boundary of the site. Because of the permeable nature of the sand and gravel outwash deposits underlying the site, most of the precipitation is expected to infiltrate into the subsurface and percolate to the groundwater table. However, Dry Creek will also receive surface runoff during wet periods, when rainwater ponds, or during heavy rainfall. This investigation occurred during a relatively wet period and Dry Creek was observed to be approaching bank-full conditions.

The staff gauge reading from 6 June 2000, indicated that the water level in Dry Creek was approximately 11 ft higher than the water table elevation in the closest wells (MW110S and D). Based on these readings, Dry Creek is not expected to be in direct hydraulic connection with the groundwater table at that location. Dry Creek would be classified as a losing stream at the time of this investigation, indicating that it would contribute water to the subsurface. The amount of water that is lost from Dry Creek to the subsurface could be calculated by testing or approximating the permeability of the channel bottom sediments. However, since the channel bottom sediments are clay and silt rich, the amount of loss from the stream is expected to be minimal.

In the residential areas, primarily south of Hononegah Road, the surface drainage pattern has been somewhat altered by construction of roadways, driveways, and buildings. Although precipitation will percolate through the lawns in the residential area, a portion will be carried by the ditch system to the Rock River.



NOTE:
BASEMAP ADAPTED FROM FIGURE 1 OF THE CONTAMINANT SOURCE EVALUATION – EVERGREEN MANOR SITE, DATED JANUARY 1997, BY CONESTOGA–ROVERS & ASSOCIATES.

FIGURE 6–1

HERNANDD–03/26/01–14:25–J:\CAD93\200\23300

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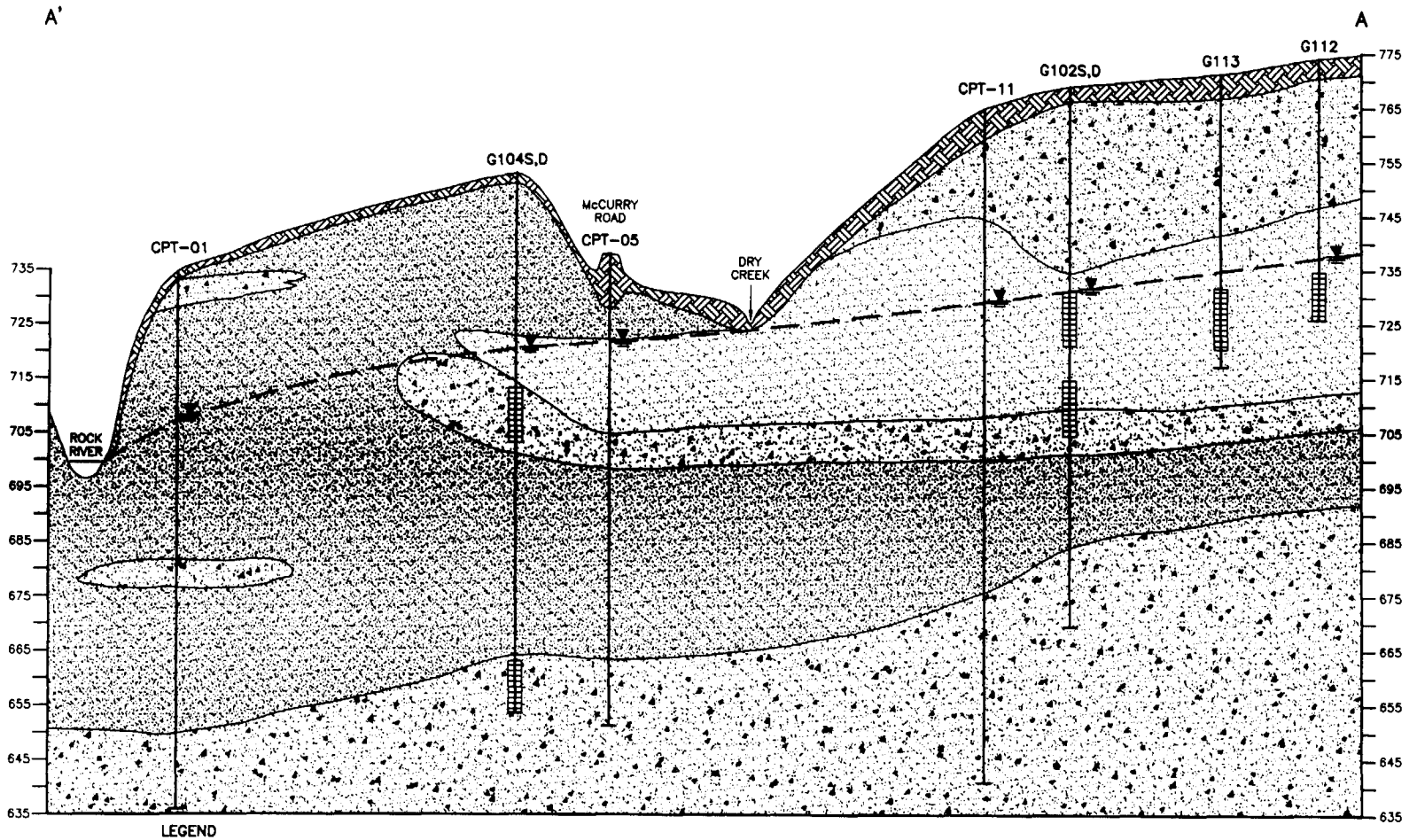
750 E. Bunker Ct.
Suite 500
Vernon Hills, Illinois
60061

CROSS SECTION TRANSECT MAP

EVERGREEN MANOR SITE
Roscoe, Illinois



LEGEND

- SCREENED INTERVAL
- FILL, TOPSOIL AND/OR ORGANICS
- WELL SORTED SAND, TRACE GRAVEL
- SAND WITH UP TO ABOUT 40% GRAVEL, AND LOCALIZED SILTY ZONES
- SAND WITH GREATER THAN ABOUT 40% GRAVEL, AND SOME SILT OR SILTY ZONES

VERTICAL 20' 0' HORIZONTAL 200'

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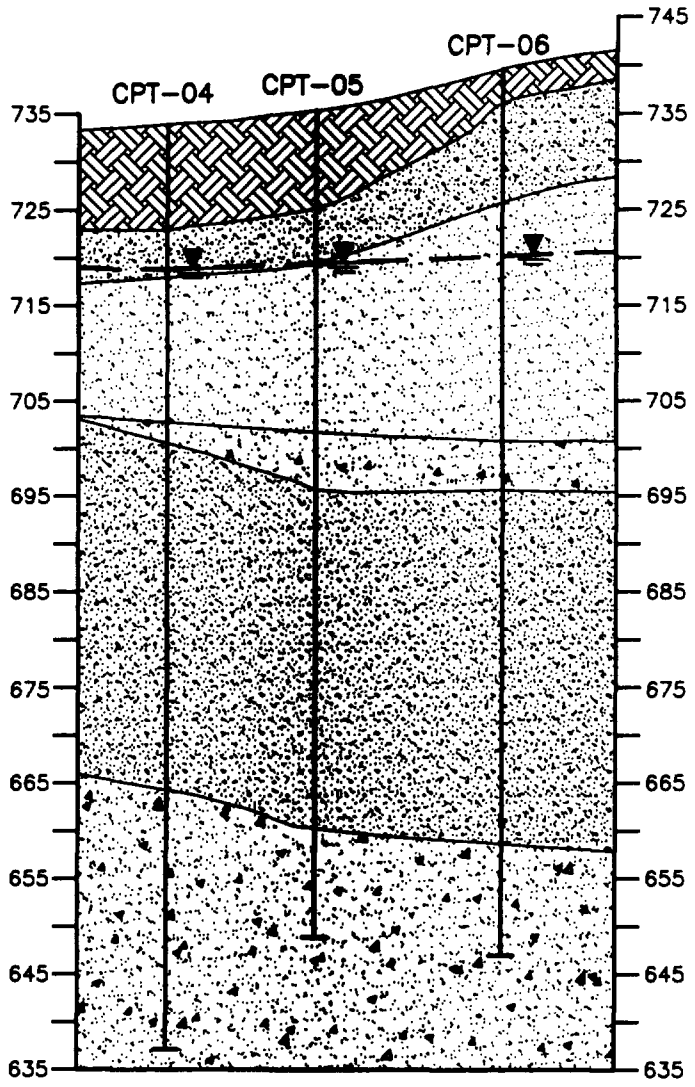
FIGURE 6-2

GEOLOGIC CROSS SECTION A-A'

EVERGREEN MANOR SITE

Roscoe, Illinois

HERNANDO-03/26/01-17:04-J:\CAD93\200\28000



LEGEND

- FILL, TOPSOIL AND/OR ORGANICS
- WELL SORTED SAND, TRACE GRAVEL
- SAND WITH UP TO ABOUT 40% GRAVEL, AND LOCALIZED SILTY ZONES
- SAND WITH GREATER THAN ABOUT 40% GRAVEL, AND SOME SILT OR SILTY ZONES

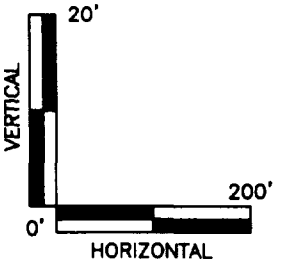


FIGURE 6-3

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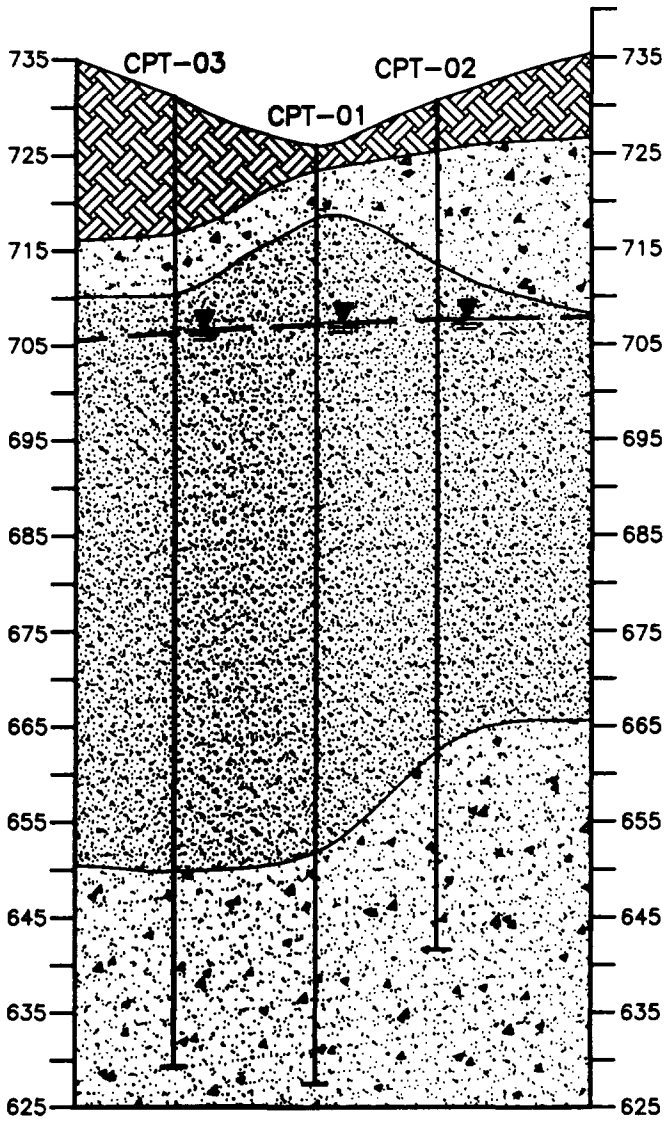
GEOLOGIC CROSS SECTION B-B'

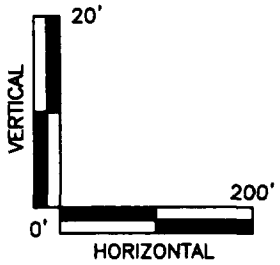
EVERGREEN MANOR SITE

Roscoe, Illinois



LEGEND

- FILL, TOPSOIL AND/OR ORGANICS
- WELL SORTED SAND, TRACE GRAVEL
- SAND WITH UP TO ABOUT 40% GRAVEL, AND LOCALIZED SILTY ZONES
- SAND WITH GREATER THAN ABOUT 40% GRAVEL, AND SOME SILT OR SILTY ZONES



HERNANDD-03/26/01-14:36-J:\CAD93\200\28100

FIGURE 6-4

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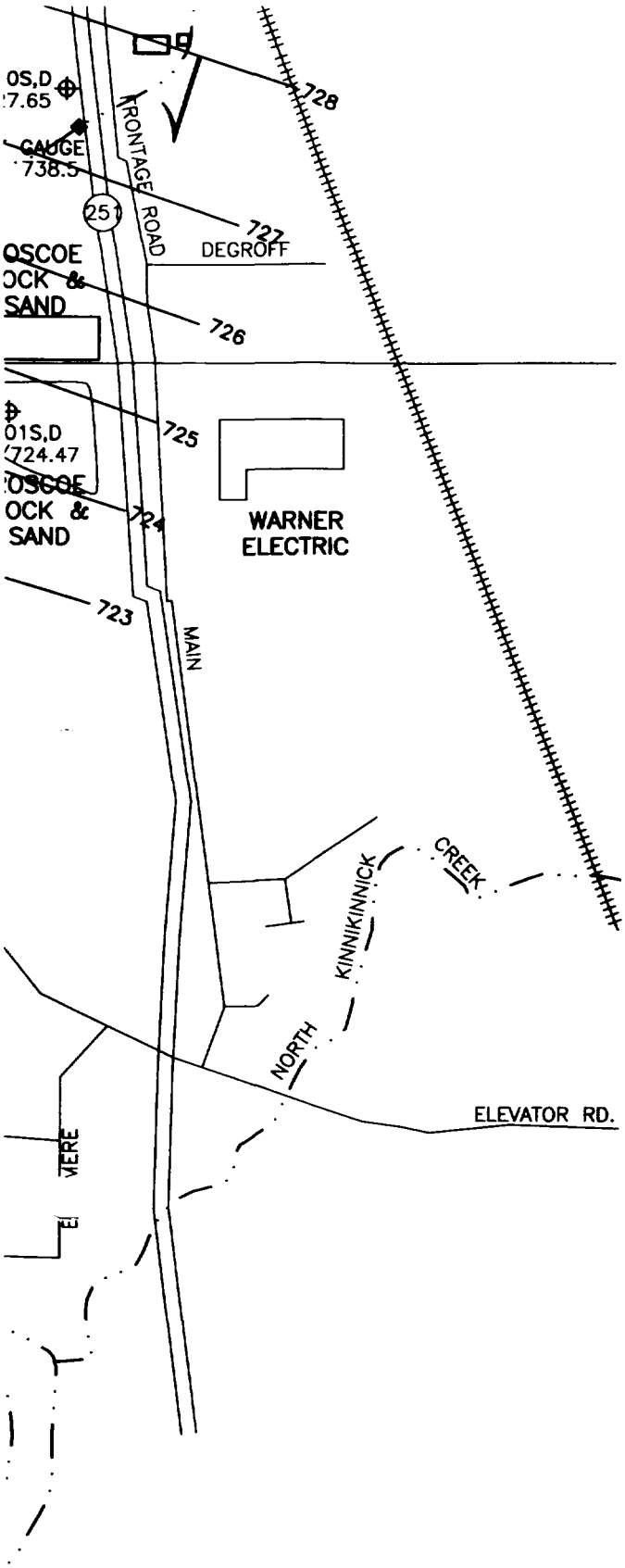
GEOLOGIC CROSS SECTION C-C'

EVERGREEN MANOR SITE

Roscoe, Illinois



NOTE:
BASEMAP ADAPTED FROM FIGURE 1 OF THE CONTAMINANT SOURCE EVALUATION – EVERGREEN MANOR SITE, DATED JANUARY 1997, BY CONESTOGA–ROVERS & ASSOCIATES.

FIGURE 6–5

WESTON MANAGERS DESIGNERS/CONSULTANTS

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GROUNDWATER PIEZOMETRIC SURFACE MAP
6 JUNE 2000
EVERGREEN MANOR SITE
Roscoe, Illinois

TABLE 6-1
Groundwater Elevations from Monitoring Wells
Evergreen Manor
Roscoe, Illinois

Well I.D.	Elevation of Top of Inner Casing (ft above MSL)	Elevation of Ground Surface (ft above MSL	Depth to Bottom (ft) 6 June 2000	Total Depth of Well (ft below grade)	Depth to Water (ft) 6 June 2000	Groundwater Elevation
MW-101S	730.29	727.5	42.64	39.9	5.82	724.47
MW-101D	730.34	727.6	82.00	79.3	5.87	724.47
MW-102S	771.09	768.7	47.71	45.3	40.20	730.89
MW-102D	771.49	769.1	67.00	64.6	40.56	730.93
MW-103S	767.21	764.3	45.11	42.2	35.90	731.31
MW-103D	767.27	764.4	58.98	56.1	35.94	731.33
MW-104S	756.13	753.3	62.43	59.6	33.55	722.58
MW-104D	755.59	753.1	102.30	99.8	32.96	722.63
MW-105S	757.95	755.2	67.85	65.1	35.15	722.80
MW-105D	757.79	755.3	101.81	99.3	34.96	722.83
MW-106S	757.20	754.8	67.50	65.1	34.15	723.05
MW-106D	756.86	754.5	102.39	100.0	33.83	723.03
MW-107S	765.79	763.4	47.34	45.0	36.56	729.23
MW-107D	766.39	763.3	67.40	64.3	37.21	729.18
MW-108S	767.01	764.4	46.98	44.4	38.33	728.68
MW-108D	766.96	764.4	67.35	64.8	38.23	728.73
MW-109S	769.91	767.3	52.45	49.8	41.69	728.22
MW-109D	769.50	766.9	72.38	69.8	41.36	728.14
MW-110S	748.19	745.4	32.53	29.7	20.60	727.59
MW-110D	748.31	745.6	52.04	49.3	20.66	727.65
MW-111	770.70	---	50.65	---	38.08	732.62
MW-112*	774.2	772.3	50.66	48.8	38.98	735.22

NOTES:
* : Elevations for MW-112 should be considered approximate, since the casing has been bent since the last vertical survey.
--- : Information not available

SECTION 7

NATURE AND EXTENT OF CONTAMINATION

One of the objectives of site characterization activities is to evaluate the nature and extent of contamination, such that informed decisions can be made regarding the level of risk presented by the site and the appropriate type of removal action necessary. During this investigation, data were collected and compared to screening levels to delineate the extent of contamination. The following subsections discuss the development and applicability of screening levels, potential sources of contamination, and the nature and extent of contamination in groundwater, surface water, and sediment.

7.1 DEVELOPMENT OF SCREENING LEVELS

Screening levels were developed to provide a means for determining the extent of contamination at this site. A screening level is an acceptable level for each contaminant of concern in each exposure route. The screening levels serve as cleanup levels protective of both human health and the environment, but are not necessarily used for direct implementation as removal action objectives (RAOs); however, they can be considered as one factor among many in the development of RAOs. The primary purpose of the screening levels is to identify constituents of potential concern (COPCs) for the site and to illustrate the extent of contamination. This section discusses the development of screening levels for individual contaminants for groundwater, sediment, and surface water.

7.1.1 Groundwater

Groundwater screening levels were developed by evaluating the applicable regulatory standards. These include the Illinois Environmental Protection Agency (IEPA) groundwater quality standards and the U.S. EPA groundwater quality standards. The IEPA standards are described in Title 35: Environmental Protection, Part 742 - Tiered Approach to Corrective Action Objectives (TACO).

Table E, *Tier I Groundwater Remediation Objectives for the Groundwater Component of the Groundwater Ingestion Route*, of Appendix B of TACO lists all of the applicable groundwater quality standards. The U.S. EPA regulatory standards are the Maximum Concentration Levels (MCLs), which are incorporated into the Safe Drinking Water Act (SDWA) and are found in 40 CFR 141.61 - Maximum Contaminant Levels (MCLs) for Organic Contaminants (Integrated). The most stringent of the two regulatory standards was chosen as the screening level for each detected constituent. If a MCL did not exist, the TACO value was used as the screening level. The screening levels are presented in Table 7-1.

7.1.2 Sediment

The data presented in Section 5.5 indicated that several constituents were detected in sediment. The screening levels are based on the IEPA standards found in Table A, *Tier 1 Soil Remediation Objectives for Residential Properties*, of Appendix B of TACO, and the U.S. EPA Region IX risk-based concentrations (RBCs) for residential ingestion exposure route (U.S. EPA, 1996). Since sediment standards do not exist in TACO, the more conservative TACO standards for soil were used. The most stringent of the two standards was used as the screening level. The screening levels are presented in Table 7-1 for those compounds which resulted in positive detections during sampling and analysis.

7.1.3 Surface Water

At a minimum, surface water data would be derived from Ambient Water Quality Criteria. However, all of the data were reported below method detection limits. Therefore, surface water screening levels were not developed.

7.2 SOURCES OF CONTAMINATION

The investigative work performed during this RI, as well as previous investigations, have attempted to identify potential sources of VOC contamination. The previous investigations were not able to identify a unique source of contamination; they were only able to generalize by indicating the source was located in or near the industrial park in the vicinity of Rockton Road and IL Route 251. The analytical results of this RI indicated that most of the contaminants detected were at low concentrations, close to the detection limits, and were likewise not able to pinpoint a specific contaminant source. The fracture trace analysis results indicated that the industrial park near Rockton Road and IL Route 251 could serve as a source area.

7.3 EXTENT OF CONTAMINATION IN GROUNDWATER

Groundwater samples were collected from 10 CPT locations, 15 monitoring wells, and 22 residential wells and analyzed for VOCs. A total of 14 distinct VOCs were found in groundwater samples above the method detection limits. Tables 7-2 through 7-4 present a summary of the detected constituents, and their respective screening levels, found in groundwater from CPT, monitoring well, and residential well sampling, respectively. The highlighted values on these tables are the results which exceeded screening levels.

A total of three compounds were found to exceed screening levels. Trichloroethene was found in residential well RW04 at a concentration of 6 µg/L. Chloroform was found in residential well RW08 at a concentrations of 0.9 µg/L. Tetrachloroethene was found in monitoring well MW103S at a concentration of 9 µg/L. No exceedances were found in the CPT samples. Thus, chloroform, tetrachloroethene, and trichloroethene are considered COPCs at the site.

Figure 7-1 shows the extent of detected VOCs in the vicinity of Evergreen Manor. This figure also identifies the three locations where screening level exceedances occurred. In large part, the extent

of the detected VOCs is based on the presence of acetone and toluene, which are present at low levels but are not considered COPCs.

The extent of contamination in groundwater is considered to occur only locally at the locations where screening level exceedances occurred. This includes the area near MW103, RW04, and RW08. These areas are within the area defined previously by other investigations.

7.4 EXTENT OF CONTAMINATION IN SEDIMENT

Table 7-5 shows the constituents detected in sediment and the screening level for each of the detected constituents. The data in this table indicated that all of these constituents were detected at concentrations considerably less than their respective screening levels. Therefore, based on the absence of screening level exceedances, none of the constituents detected in sediment are considered COPCs, and the sediment at the site is not considered contaminated.

7.5 EXTENT OF CONTAMINATION IN SURFACE WATER

Based on the fact that all of the surface water data were reported as not detected above the method detection limits, none of the analyzed constituents are considered COPCs, and the surface water is not considered contaminated.

Table 7-2
Summary of Detected Consituents in Groundwater
CPT - VOCs
Evergreen Manor, Roscoe, Illinois

Sample ID:		CPT-02-02	CPT02-03	CPT-02-03	CPT-02-04	CPT-02-05	CPT-02-06	CPT-02-07	CPT-03-01	CPT-03-02	CPT-03-02DP
Sample Number:		---	EABX4	---	---	---	---	---	---	---	---
Sample Date:		6/2/00	6/2/00	6/2/00	6/2/00	6/2/00	6/2/00	6/2/00	5/26/00	5/26/00	5/26/00
Laboratory:		ESAT	MitKem	ESAT	ESAT	ESAT	ESAT	ESAT	ESAT	ESAT	ESAT
Sample Screen Depth (ft below ground):		34	42	42	51	68	78	84	29	42	42
Units:		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Parameter	(Screening Level)										
Acetone	(700)	2 UJ	470	55 J	2 UJ	2 UJ	2 UJ	2 UJ	20 B	32 B	19 B
Methylene Chloride	(5)	1 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethane	(700)	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
2-Butanone	(---)	11 UJ	25 U	11 UJ	11 UJ	11 UJ	11 UJ	11 UJ	11 U	11 U	11 U
Cis-1,2-Dichloroethene	(70)	4 U	5 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U
1,1,1-Trichloroethane	(200)	2 U	5 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Benzene	(5)	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichloroethene	(5)	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Toluene	(1000)	0.6 J	5 U	0.7 J	0.5 J	1 J	1 J	1 U	0.8 J	1 J	0.8 J
Tetrachloroethene	(5)	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Ethylbenzene	(700)	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
m-&/or p-Xylene	(10,000)	0.5 J	---	1 U	1 U	1 U	1 U	0.6 J	1 U	1 U	1 U
o-xylene	(10,000)	1 U	---	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Xylenes (total)	(10,000)	---	5 U	---	---	---	---	---	---	---	---

Table 7-2
Summary of Detected Consituents in Groundwater
CPT - VOCs
Evergreen Manor, Roscoe, Illinois

Sample ID:		CPT-03-05	CPT03-06	CPT-03-06	CPT-03-07	CPT-04-01	CPT-04-02	CPT-04-02	CPT04-02DP	CPT-04-02DUP
Sample Number:		---	EABX5	---	---	---	---	EABW5	EABW6	---
Sample Date:		5/26/00	6/2/00	6/2/00	6/2/00	5/29/00	5/29/00	5/29/00	5/29/00	5/29/00
Laboratory:		ESAT	MitKem	ESAT	ESAT	ESAT	ESAT	MitKem	MitKem	ESAT
Sample Screen Depth (ft below ground):		84	92	92	102	32	46	46	46	46
Units:		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Parameter	(Screening Level)									
Acetone	(700)	9 J	5 U	2 UJ	2 UJ	2 U	10 B	5 U	5 U	2 U
Methylene Chloride	(5)	0.5 J	2 U	1 U	1 U	1 U	1 U	2 U	2 U	1 U
1,1-Dichloroethane	(700)	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
2-Butanone	(---)	11 U	5 U	11 UJ	11 UJ	11 U	11 U	5 U	5 U	11 U
Cis-1,2-Dichloroethene	(70)	4 U	1 U	4 U	4 U	4 U	4 U	1 U	1 U	4 U
1,1,1-Trichloroethane	(200)	2 U	0.9 J	0.9 J	0.8 J	2 U	2 U	1 U	1 U	2 U
Benzene	(5)	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichloroethene	(5)	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Toluene	(1000)	1 J	2	2 J	2 J	1 J	0.8 J	0.6 J	0.8 J	0.9 J
Tetrachloroethene	(5)	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Ethylbenzene	(700)	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
m-&/or p-Xylene	(10,000)	1 U	---	1 U	1 U	1 U	1 U	---	---	1 U
o-xylene	(10,000)	1 U	---	1 U	1 U	1 U	1 U	---	---	1 U
Xylenes (total)	(10,000)	---	1 U	---	---	---	---	1 U	1 U	---

Table 7-2
Summary of Detected Consituents in Groundwater
CPT - VOCs
Evergreen Manor, Roscoe, Illinois

Sample ID:		CPT-04-05	CPT-04-06	CPT-04-07	CPT-05-01	CPT-05-02	CPT-05-03	CPT-05-04	CPT-05-05DUP	CPT-05-06	CPT-05-07
Sample Number:		---	---	---	---	---	---	---	---	---	---
Sample Date:		5/29/00	5/29/00	5/29/00	5/29/00	5/29/00	5/29/00	5/29/00	5/30/00	5/30/00	5/30/00
Laboratory:		ESAT	ESAT	ESAT	ESAT	ESAT	ESAT	ESAT	ESAT	ESAT	ESAT
Sample Screen Depth (ft below ground):		78	84	93	35	43	51	57	69.5	78	87
Units:		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Parameter	(Screening Level)										
Acetone	(700)	2 U	8 B	9 B	2 U	2 U	2 U	2 U	2 U	100 J	2 U
Methylene Chloride	(5)	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethane	(700)	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
2-Butanone	(---)	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	16 J	11 U
Cis-1,2-Dichloroethene	(70)	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U
1,1,1-Trichloroethane	(200)	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Benzene	(5)	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichloroethene	(5)	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Toluene	(1000)	1 J	0.8 J	1 J	1 J	1 J	1 J	1 J	0.6 J	0.8 J	1 J
Tetrachloroethene	(5)	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Ethylbenzene	(700)	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
m-&/or p-Xylene	(10,000)	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
o-xylene	(10,000)	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Xylenes (total)	(10,000)	---	---	---	---	---	---	---	---	---	---

Table 7-2
Summary of Detected Consituents in Groundwater
CPT - VOCs
Evergreen Manor, Roscoe, Illinois

Sample ID:		CPT-06-02	CPT-06-03	CPT-06-04	CPT-06-05	CPT06-06	CPT-06-06	CPT-09-01	CPT-09-04	CPT-09-05	CPT-09-06
Sample Number:		—	—	—	—	EABW9	—	—	—	—	—
Sample Date:		6/1/00	6/1/00	6/1/00	6/1/00	6/1/00	6/1/00	5/30/00	5/30/00	5/30/00	5/30/00
Laboratory:		ESAT	ESAT	ESAT	ESAT	MitKem	ESAT	ESAT	ESAT	ESAT	ESAT
Sample Screen Depth (ft below ground):		42	53	62	74	85	85	35	68	75	85
Units:		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Parameter	(Screening Level)										
Acetone	(700)	53 J	11 J	7 J	11 J	7 U	2 U	2 U	2 U	2 U	11 J
Methylene Chloride	(5)	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethane	(700)	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
2-Butanone	(—)	11 U	11 U	11 U	11 U	5 U	11 U	11 U	11 U	11 U	11 U
Cis-1,2-Dichloroethene	(70)	4 U	4 U	4 U	4 U	1 U	4 U	4 U	4 U	4 U	4 U
1,1,1-Trichloroethane	(200)	2 U	2 U	2 U	2 U	1 U	2 U	2 U	2 U	2 U	2 U
Benzene	(5)	1 U	1 U	1 U	1 U	1 U	1 U	0.5 J	1 U	1 U	1 U
Trichloroethene	(5)	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Toluene	(1000)	0.8 J	0.8 J	1 J	1 J	2	2 J	1 J	0.8 J	0.5 J	0.8 J
Tetrachloroethene	(5)	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Ethylbenzene	(700)	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
m-&/or p-Xylene	(10,000)	1 U	1 U	1 U	1 U	—	1 U	1 U	1 U	1 U	1 U
o-xylene	(10,000)	1 U	1 U	1 U	1 U	—	1 U	1 U	1 U	1 U	1 U
Xylenes (total)	(10,000)	—	—	—	—	1 U	—	—	—	—	—

Table 7-2
Summary of Detected Consituents in Groundwater
CPT - VOCs
Evergreen Manor, Roscoe, Illinois

Sample ID:		CPT-10-01	CPT-10-03	CPT-10-04	CPT-10-4DUP	CPT-10-05	CPT-10-06	CPT-10-07	CPT11-01	CPT-11-01
Sample Number:		---	---	---	---	---	---	---	EABX7	---
Sample Date:		5/31/00	5/31/00	6/1/00	6/1/00	6/1/00	6/1/00	6/1/00	6/3/00	6/3/00
Laboratory:		ESAT	ESAT	ESAT	ESAT	ESAT	ESAT	ESAT	MitKem	ESAT
Sample Screen Depth (ft below ground):		25	42	55	55	65	73	90	45	45
Units:		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Parameter	(Screening Level)									
Acetone	(700)	2 U	40 B	2 U	2 U	2 U	24 J	2 U	5 U	2 UJ
Methylene Chloride	(5)	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U
1,1-Dichloroethane	(700)	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
2-Butanone	(—)	11 U	11 U	11 U	11 U	11 U	11 U	11 U	5 U	11 UJ
Cis-1,2-Dichloroethene	(70)	4 U	4 U	4 U	4 U	4 U	4 U	4 U	1 U	4 U
1,1,1-Trichloroethane	(200)	2 U	2 U	1 J	1 J	0.8 J	2 U	2 U	1 U	2 U
Benzene	(5)	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichloroethene	(5)	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Toluene	(1000)	0.9 J	1 J	0.5 J	1 U	0.9 J	1 J	1 J	1 U	1 U
Tetrachloroethene	(5)	1 U	1 U	0.6 J	0.6 J	1 U	1 U	1 U	1 U	1 U
Ethylbenzene	(700)	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
m-&/or p-Xylene	(10,000)	1 U	1 U	1 U	1 U	1 U	1 U	1 U	—	1 U
o-xylene	(10,000)	1 U	1 U	1 U	1 U	1 U	1 U	1 U	—	1 U
Xylenes (total)	(10,000)	—	—	—	—	—	—	—	0.6 J	—

Table 7-2
Summary of Detected Consituents in Groundwater
CPT - VOCs
Evergreen Manor, Roscoe, Illinois

Sample ID:		CPT-11-04	CPT11-05	CPT-11-05	CPT11-05DP	CPT-11-06	CPT-11-07	CPT11-08	CPT-11-08	CPT-12-01	CPT-12-01DUP
Sample Number:		---	EABX9	---	EABQ1	---	---	EABQ2	---	---	---
Sample Date:		6/3/00	6/3/00	6/3/00	6/3/00	6/3/00	6/3/00	6/3/00	6/3/00	6/5/00	6/5/00
Laboratory:		ESAT	MitKem	ESAT	MitKem	ESAT	ESAT	MitKem	ESAT	ESAT	ESAT
Sample Screen Depth (ft below ground):		81	93	93	93	102	114	125	125	45	
Units:		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Parameter	(Screening Level)										
Acetone	(700)	2 UJ	5 U	2 UJ	5 U	9 J	13 J	5 U	2 UJ	1 B	1 B
Methylene Chloride	(5)	1 U	2 U	1 U	2 U	1 U	1 U	2 U	1 U	1 U	1 U
1,1-Dichloroethane	(700)	1 U	2	1 U	2	1 U	1 U	1 U	1 UJ	1 U	1 U
2-Butanone	(---)	11 UJ	5 U	11 UJ	5 U	11 UJ	11 UJ	5 U	11 UJ	11 U	11 U
Cis-1,2-Dichloroethene	(70)	4 U	1 U	4 U	1 U	4 U	4 U	1 U	4 U	4 U	4 U
1,1,1-Trichloroethane	(200)	0.8 J	2	2 J	3	3 J	2 U	0.7 J	2 U	2 U	2 U
Benzene	(5)	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichloroethene	(5)	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Toluene	(1000)	0.9 J	2	1 J	0.8 J	1 J	2 J	2	3 J	0.5 J	0.5 J
Tetrachloroethene	(5)	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Ethylbenzene	(700)	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
m-&/or p-Xylene	(10,000)	1 U	---	1 U	---	1 U	1 U	---	1 U	1 U	1 U
o-xylene	(10,000)	1 U	---	1 U	---	1 U	1 U	---	1 U	1 U	1 U
Xylenes (total)	(10,000)	---	1 U	---	1 U	---	---	1 U	---	---	---

Table 7-2
Summary of Detected Consituents in Groundwater
CPT - VOCs
Evergreen Manor, Roscoe, Illinois

Sample ID:		CPT-12-03	CPT-12-04	CPT-12-04DUP	CPT-12-05	CPT12-06	CPT-12-06	CPT-12-07
Sample Number:		EABQ3	---	---	---	EABQ7	---	---
Sample Date:		6/5/00	6/5/00	6/5/00	6/5/00	6/5/00	6/5/00	6/5/00
Laboratory:		MitKem	ESAT	ESAT	ESAT	MitKem	ESAT	ESAT
Sample Screen Depth (ft below ground):		70	81	81	93	102	102	118
Units:		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Parameter	(Screening Level)							
Acetone	(700)	5 U	2 B	7 B	2	5 U	2	2
Methylene Chloride	(5)	2 U	1 U	1 U	1 U	2 U	1 U	1 U
1,1-Dichloroethane	(700)	1 U	1 U	1 U	1 U	1 U	1 U	1 U
2-Butanone	(---)	5 U	11 U	11 U	11 U	5 U	11 U	11 U
Cis-1,2-Dichloroethene	(70)	1 U	4 U	4 U	4 U	1 U	4 U	4 U
1,1,1-Trichloroethane	(200)	1 U	2 U	2 U	2 U	1 U	2 U	2 U
Benzene	(5)	1 U	1 U	0.5 J	1 U	1 U	1 U	1 U
Trichloroethene	(5)	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Toluene	(1000)	0.8 J	0.9 J	1 U	2 J	1	2 J	2 J
Tetrachloroethene	(5)	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Ethylbenzene	(700)	1 U	1 U	1 U	1 U	1 U	1 U	1 U
m-&/or p-Xylene	(10,000)	---	1 U	1 U	1 U	---	1 U	1 U
o-xylene	(10,000)	---	1 U	1 U	1 U	---	1 U	1 U
Xylenes (total)	(10,000)	1 U	---	---	---	1 U	---	---

Highlighting indicates compound exceeded the Screening Level.

U - Constituent not detected; method detection limit (MDL) of the analysis reported.

J - Concentration reported is an estimated value.

UJ - The analyte was not detected above the reported sample quantition limit.

B - Designates the constituent was detected in the method blank.

--- Indicates compounds not analyzed.

Table 7-3
Summary of Detected Constituents in Groundwater
Monitoring Wells - VOCs
Evergreen Manor, Roscoe, Illinois

Sample ID:	MW101D	MW101S	MW102D	MW102S	MW103D	MW103D-DL	MW103S	MW104D	MW104D-DUP
Sample Number:	---	---	---	---	---	---	---	---	---
Sample Date:	5/30/00	5/30/00	6/1/00	6/1/00	5/31/00	5/31/00	5/31/00	6/2/00	6/2/00
Laboratory:	ESAT	ESAT	ESAT	ESAT	ESAT	ESAT	ESAT	ESAT	ESAT
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
PARAMETER (Screening Level)									
1,1,1-Trichloroethane (200)	2 U	2 U	2 U	2 U	3 J	50 U	2 U	1 J	1 J
1,1,2-Trichloro-1,2,2-trifluoromethane (---)	2 UJ	2 UJ	2 U	2 UJ	300 J	180 J	2 J	2 UJ	2 UJ
Cis-1,2-Dichloroethene (70)	4 U	4 U	4 U	4 U	4 U	100 U	4 U	4 U	4 U
Tetrachloroethene (5)	1 U	1 U	1 U	1 U	0.5 J	25 U	9 J	1 U	1 U
Trichloroethene (5)	2 J	1 U	1 U	1 U	1 U	25 U	1 U	1 U	1 U

Table 7-3
Summary of Detected Constituents in Groundwater
Monitoring Wells - VOCs
Evergreen Manor, Roscoe, Illinois

Sample ID:	MW104S	MW105D	MW105D-01	MW105S	MW108D	MW108D-01	MW108D-DUP	MW108S	MW110D	MW110S	MW112
Sample Number:	---	---	EABX1	---	---	EABW8	---	---	---	---	---
Sample Date:	6/2/00	6/2/00	6/2/00	6/2/00	6/1/00	6/1/00	6/1/00	6/1/00	6/1/00	6/1/00	6/2/00
Laboratory:	ESAT	ESAT	MitKem	ESAT	ESAT	MitKem	ESAT	ESAT	ESAT	ESAT	ESAT
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
PARAMETER (Screening Level)											
1,1,1-Trichloroethane (200)	2 J	2 J	3.00	2 J	2 U	1 U	2 U	2 U	2 U	2 U	2 J
1,1,2-Trichloro-1,2,2-trifluoromethane (---)	2 UJ	2 UJ	---	2 UJ	2 UJ	---	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ
Cis-1,2-Dichloroethene (70)	4 J	1 J	2.00	1 J	4 U	1 U	4 U	4 U	4 U	4 U	4 U
Tetrachloroethene (5)	1 J	3 J	4.00	3 J	0.6 J	0.7 J	0.6 J	1 U	1 U	1 U	1 U
Trichloroethene (5)	1 J	2 J	3.00	2 J	1 U	1 U	1 U	1 U	1 U	1 U	1 U

Highlighting indicates compound exceeded the Screening Level.

U - Constituent not detected; method detection limit (MDL) of the analysis is reported.

J - Concentration reported is an estimated value.

UJ - The analyte was not detected above the reported sample quantitation limit.

DL - Designates sample was diluted.

B - Designates the constituent was detected in the method blank.

--- Indicates compound not analyzed.

Table 7-4
Summary of Detected Constituents in Groundwater
Residential Wells - VOCs
Evergreen Manor, Roscoe, Illinois

Sample ID:		RW01-01	RW02-01	RW-03	RW-04	RW04-01	RW-05	RW-05DUP	RW-06	RW-07	RW-08,
Sample Number:		—	—	—	—	EABQ4	—	—	—	—	—
Sample Date:		5/31/00	5/31/00	6/5/00	6/5/00	6/5/00	6/5/00	6/5/00	6/5/00	6/5/00	6/5/00
Address:											
Laboratory:		ESAT	ESAT	ESAT	ESAT	MITKEM	ESAT	ESAT	ESAT	ESAT	ESAT
Units		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
PARAMETER	(Screening Level)										
1,1,1-Trichloroethane	(200)	2 U	2 U	2 J	2 J	2.00	2 U	2 U	2 U	5 J	0.9 J
Acetone	(700)	2 U	2 U	0.80	2 U	5 U	2 U	0.60	2 U	2 U	2 U
Chloroform	(0.02)	3 U	3 U	3 U	3 U	1 U	3 U	3 U	3 U	3 U	0.9 J
Cis-1,2-Dichloroethene	(70)	4 U	4 U	4 U	1 J	2.00	4 U	4 U	4 U	4 U	4 U
Tetrachloroethene	(5)	1 U	1 U	1 U	2 J	2.00	1 U	1 U	1 U	1 U	1 U
Trichloroethene	(5)	1 U	1 U	1 U	5 J	3.00	1 U	1 U	1 U	0.7 J	1 U

Table 7-4
Summary of Detected Constituents in Groundwater
Residential Wells - VOCs
Evergreen Manor, Roscoe, Illinois

Sample ID:		RW-18	RW-19	RW-19DUP	RW-20	RW-21	RW-22
Sample Number:		---	---	---	---	---	---
Sample Date:		6/6/00	6/6/00	6/6/00	6/6/00	6/6/00	6/6/00
Address:							
Laboratory:		ESAT	ESAT	ESAT	ESAT	ESAT	ESAT
Units		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
PARAMETER	(Screening Level)						
1,1,1-Trichloroethane	(200)	2 U	1 J	0.6 J	2 U	2 U	2 U
Acetone	(700)	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ
Chloroform	(0.02)	3 U	3 U	3 U	3 U	3 U	3 U
Cis-1,2-Dichloroethene	(70)	4 U	4 U	4 U	4 U	4 U	4 U
Tetrachloroethene	(5)	1 U	0.9 J	0.9 J	1 U	1 U	1 U
Trichloroethene	(5)	1 U	4 J	4 J	1 U	1 U	1 U

Highlighting indicates compound exceeded the Screening Level.

U - Constituent not detected; method detection limit (MDL) of the analysis reported.

J - Concentration reported is an estimated value.

UJ - The analyte was not detected above the reported sample quantition limit.

B - Designates the constituent was detected in the method blank.

Table 7-4
Summary of Detected Constituents in Groundwater
Residential Wells - VOCs
Evergreen Manor, Roscoe, Illinois

Sample ID:		RW-10	RW-11	RW-11DUP	RW11-01	RW11-01DP	RW-12	RW-13	RW-14	RW-15	RW-16
Sample Number:		---	---	---	EABQ5	EABQ6	---	---	---	---	---
Sample Date:		6/5/00	6/5/00	6/5/00	6/5/00	6/5/00	6/5/00	6/6/00	6/6/00	6/6/00	6/6/00
Address:											
Laboratory:		ESAT	ESAT	ESAT	MITKEM	MITKEM	ESAT	ESAT	ESAT	ESAT	ESAT
Units		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
PARAMETER	(Screening Level)										
1,1,1-Trichloroethane	(200)	2 U	1 J	1 J	1.00	1.00	2 U	2 U	2 U	2 U	2 U
Acetone	(700)	2 U	2 U	2 U	5 U	5 U	2 U	2 UJ	2 UJ	2 UJ	2 UJ
Chloroform	(0.02)	3 U	3 U	3 U	1 U	1 U	3 U	3 U	3 U	3 U	3 U
Cis-1,2-Dichloroethene	(70)	4 U	4 U	4 U	1 U	1 U	4 U	4 U	4 U	4 U	4 U
Tetrachloroethene	(5)	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichloroethene	(5)	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U

Table 7-1
Screening Levels for
Detected Constituents
Evergreen Manor, Roscoe, Illinois

GROUNDWATER

Constituent	IEPA Tier I Groundwater Remediation Objective (µg/L)	U.S. EPA Maximum Contaminant Level (µg/L)	Screening Level (µg/L)
1,1,1-trichloroethane	200	200	200
1,1,2-trichloro-1,2,2-trifluoromethane	—	—	—
1,1-dichloroethane	700	—	700
1,2-dichloroethane	5	5	5
2-butanone	—	—	—
Acetone	700	—	700
Benzene	5	5	5
Chloroform	0.02	—	0.02
cis-1,2-dichloroethene	70	70	70
Ethylbenzene	700	700	700
Methylene chloride	5	5	5
Tetrachloroethene	5	5	5
Toluene	1,000	1,000	1,000
Trichloroethene	5	5	5
Xylenes	10,000	10,000	10,000

SEDIMENT

Constituent	IEPA Tier I Soil Remediation Objective (µg/kg)	Region IX Risk Based Concentrations ** (µg/kg)	Screening Level (µg/kg)
Benzene	800 *	1,400	800
Chloroform	300 *	520	300
Methyl Acetate	—	—	—
Toluene	650,000 *	520,000	520,000

* - Remediation objective is based on the inhalation exposure route.
** - Region IX RBCs are based on residential property use.

Table 7-2
Summary of Detected Consituents in Groundwater
CPT - VOCs
Evergreen Manor, Roscoe, Illinois

Sample ID:		CPT-01-01	CPT-01-02	CPT-01-03	CPT-01-04	CPT-01-05	CPT-01-06	CPT-01-07	CPT-01-08	CPT02-01
Sample Number:		—	—	—	—	—	—	—	—	EABX3
Sample Date:		5/25/00	5/25/00	5/25/00	5/25/00	5/25/00	5/25/00	5/25/00	5/25/00	6/2/00
Laboratory:		ESAT	ESAT	ESAT	ESAT	ESAT	ESAT	ESAT	ESAT	MitKem
Sample Screen Depth (ft below ground):		99	89	79	69	59	49	39	29	28
Units:		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Parameter	(Screening Level)									
Acetone	(700)	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ	15 B	2 UJ	5 U
Methylene Chloride	(5)	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U
1,1-Dichloroethane	(700)	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
2-Butanone	(—)	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	5 U
Cis-1,2-Dichloroethene	(70)	4 U	2 J	1 J	1 J	1 J	1 J	4 U	4 U	1 U
1,1,1-Trichloroethane	(200)	2 U	1 J	1 J	1 J	1 J	2 U	1 J	2 U	1 U
Benzene	(5)	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichloroethene	(5)	2 J	3 J	4 J	4 J	3 J	4 J	3 J	2 J	1 U
Toluene	(1000)	0.7 J	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.5 J
Tetrachloroethene	(5)	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Ethylbenzene	(700)	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
m-&/or p-Xylene	(10,000)	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	—
o-xylene	(10,000)	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	—
Xylenes (total)	(10,000)	—	—	—	—	—	—	—	—	0.6 J

Table 7-5
Summary of Detected Constituents in Sediment
VOCs
Evergreen Manor, Roscoe, Illinois

Sample ID:	SD01-01	SD01-01DUP	SD02-01	SD03-01	SD04-01	SD04-01	SD04-01DP	SD05-01	SD06-01	Screening Level
Sample Number:	---	---	---	---	---	EABQ9	EABR1	---	---	
Sample Date:	5/24/00	5/24/00	5/23/00	5/23/00	5/24/00	5/24/00	5/24/00	5/24/00	5/23/00	
Laboratory:	ESAT	ESAT	ESAT	ESAT	ESAT	DATACHEM	DATACHEM	ESAT	ESAT	
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
PARAMETER										
Benzene	5 U	5 U	5 U	5 U	5 U	12 U	2 J	5 U	5 U	800
Chloroform	8 J	50 UJ	50 UJ	50 UJ	50 UJ	12 U	12 U	50 UJ	50 UJ	300
Methyl Acetate	5 J	15 U	9 J	15 U	15 U	12 U	12 U	9 J	15 U	---
Toluene	5 U	5 U	5 U	5 U	5 U	12 U	0.7 J	5 U	5 U	650,000

--- Screening Level is not available for this constituent.
U - Constituent not detected; method detection limit (MDL) of the analysis reported.
J - Concentration reported is an estimated value.
UJ - The analyte was not detected above the reported sample quantition limit.

SECTION 8

CONTAMINANT FATE AND TRANSPORT

The fate and transport of the contaminants present at the Evergreen Manor site, and the primary geochemical factors influencing their concentrations and behavior, are discussed in this section. These factors include dispersion, dilution, adsorption, oxidation, and geochemical behavior. Physical characteristics of the site and the nature and extent of contamination, which have a substantial influence on the factors affecting the fate and transport of contaminants, are also addressed in this section. This section concludes with the results of a contaminant transport model used to estimate the time it will take to achieve screening levels at the site.

8.1 CONTAMINANTS OF POTENTIAL CONCERN

The COPCs at the Evergreen Manor site were identified based on the extent of contamination at the site and the contaminants' potential to migrate. The COPCs at the site include three VOCs in groundwater, as described in Section 7 and the following subsections.

Groundwater

Chemical constituents exceeding screening levels in groundwater include chloroform, tetrachloroethene, and trichloroethene. Chloroform was detected at a concentration considerably above its screening level, and tetrachloroethene and trichloroethene were detected only slightly above their screening levels; therefore, these three VOCs are considered to be COCs in the groundwater at the Evergreen Manor site.

8.2 FATE OF CONTAMINANTS OF CONCERN

In groundwater, chloroform, tetrachloroethene, and trichloroethene were detected above their screening levels. These compounds are classified as volatile chlorinated hydrocarbons, and are moderately to readily water soluble.

Chloroform has an adsorption rate to soil that should be insignificant at the Evergreen Manor site. Therefore, chloroform should be highly mobile in the groundwater environment. Chloroform does not readily biodegrade in groundwater and may remain in the dissolved phase for extended periods of time. Bioconcentration is not expected to be significant. Biodegradation products include methylene chloride (Howard, 1990).

Tetrachloroethene has a moderate adsorption rate to soil that creates a low to medium mobility in the groundwater environment. Biodegradation does not occur under aerobic conditions and is slow under anaerobic conditions if the microbes have been acclimated. Bioconcentration is not expected to be significant in aquatic organisms. Biodegradation products include trichloroethene, cis- and trans-1,2-dichloroethene, methylene chloride, chloroethene, and vinyl chloride (Howard, 1990).

Trichloroethene has an adsorption rate to soil that should not be significant. Therefore, trichloroethene is expected to be highly mobile in the groundwater environment. Biodegradation occurs in water under most conditions. Bioconcentration is moderate in aquatic organisms. cis-1,2-Dichloroethene is the primary biodegradation product (Howard, 1990).

Physical and chemical properties of these organic compounds are presented in greater detail in Table 8-1.

8.3 CONTAMINANT MIGRATION PATHWAY

After a chemical is released into the environment, it may be transported (i.e., advective transport), physically transformed (i.e., volatilized), chemically transformed (i.e., via oxidation/reduction), biologically transformed (i.e., biodegradation), or bioaccumulated in one or more media. Contaminant migration pathway analysis identifies other (non-source) environmental media and off-site areas potentially affected by contaminant migration.

The following addresses the possible migration pathways of contaminants at the Evergreen Manor site, their potential to be transported to other environmental media, and their potential to migrate off-site. Table 8-2 presents a summary of the migration characteristics of contaminants at the site.

Groundwater Dispersion and Biodegradation

Most of the contaminant transport at the site is achieved through advective transport (i.e., through groundwater movement). However, because of the low concentrations present at the site, it is likely that the concentrations are also being reduced through dispersion and/or biodegradation. Dispersion can be thought of as the spread of contaminants that occurs in addition to being transported by advection. Biodegradation is the chemical break down of one constituent into another, or into a more elemental form. The result of both of these mechanisms is to reduce the concentration of the constituents in groundwater.

Table 8-3 presents detected constituent concentrations from the HRS package and this RI. Average concentrations are also presented and show the decline in groundwater VOC levels between the HRS scoring period and the current RI results. Table 8-4 directly compares residential well data from the HRS package and this RI for locations sampled during both sampling events. The two comparable locations show that 1,1,1-TCA and TCE concentrations have declined, while the trend is unknown for cis-1,2-DCE and PCE, since data were not presented for these locations in the HRS package. Table 8-5 compares monitoring well data from the HRS package and this RI for wells sampled during both events. In general the contaminant concentrations declined, or in some instances

remained approximately the same. The trend is not known for cis-1,2-DCE and PCE concentrations at MW-104S, because the HRS package did not present data for these constituents.

The effectiveness of biodegradation was evaluated by following a procedure found in the *Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Ground Water* (U.S. EPA, 1998c). By applying a score to the various water quality parameters and constituent concentrations, at each sampling point, it was possible to judge whether or not anaerobic biodegradation (reductive dechlorination) could be occurring. The highest cumulative score achieved was three points, which was interpreted as, "Inadequate evidence for anaerobic biodegradation of chlorinated organics," (U.S. EPA, 1998c). Strong evidence of biodegradation can be achieved with a score of 15 or more points. Thus, biodegradation is not expected to be a considerable factor to concentration reduction of COCs, when compared to the effect of dispersion. This does not imply, however, that biodegradation is not occurring.

Groundwater to Air Pathway

Based on groundwater depths and chemical contaminants present, it is unlikely that migration of chemical contaminants from groundwater to air would occur. Volatilization of VOCs in groundwater is possible; however, this is not likely to be a significant process and is subsequently of minimal concern.

Therefore, the migration of groundwater contaminants via the groundwater to air pathway is not a pathway of potential concern.

Groundwater to Surface Water Pathway

Contaminants in groundwater may migrate to the Rock River. Because of the difference in elevation between the water table and Dry Creek, in the vicinity of the site, it is not expected that contaminated groundwater would migrate to Dry Creek. Based on the groundwater gradient shown in Figure 6-5, and the elevation of the Rock River south of the site (approximately 700 ft MSL), the expectation

is that groundwater discharges to the Rock River. Migration of contaminants could occur where groundwater discharges to surface water.

The results of the surface water sampling indicated that VOCs were not detected in the Rock River. This is most likely due to dilution that occurs when a relatively small volume of groundwater is discharged to the Rock River and is mixed with a relatively large volume of surface water.

Based on the relatively low COC concentrations detected at the site, and the large amount of dilution occurring, the groundwater to surface water migration pathway does not appear to be a concern at the Evergreen Manor site.

8.4 TRANSPORT MODELING

A modeling approach was taken to estimate the time for contaminants to decline to below screening levels. A simple groundwater model was used to simulate the transport of contaminants through the saturated subsurface. Based on the available data, an analytical model approach was determined to be applicable. The BIOSCREEN Natural Attenuation Decision Support System (Newell, 1996) was the model used to simulate contaminant transport.

8.4.1 BIOSCREEN

BIOSCREEN was written to support natural attenuation of hydrocarbons at petroleum sites, however, the transport code is equally applicable for other dissolved contaminants. The model takes into consideration advection, dispersion, adsorption, and biodegradation; however, since biodegradation could not be proved to be occurring at the Evergreen Manor site, based on RI analytical data, it was not incorporated into the model.

BIOSCREEN models a single contaminant originating from a source area with a known contaminant mass. The model uses a half-life approach to reducing the contaminant mass at the source. With a small source mass input, the model can be used to approximate a short term or nearly instantaneous

contaminant release. Although unknown, it is presumed that the release at the site can be modeled as short term or nearly instantaneous release.

The limitations of the BIOSCREEN model are that it assumes simple groundwater flow conditions, and only approximates more complicated processes. The sand and gravel aquifer underlying the Evergreen Manor site is assumed to be fairly homogeneous, and can be modeled as one continuous flow system. The distribution of chemical data at the Evergreen Manor site is more complex, and BIOSCREEN was used to provide approximations of contaminant concentrations.

BIOSCREEN can estimate concentration distributions either along the axis of a plume, or across the modeled area. To simplify the modeling approach, calibration data were assumed to be located along the axis of the plume, and only the output of concentration distributions along the axis of the plume were evaluated.

8.4.2 Input and Assumptions

Table 8-6 presents the input parameters used in each of the four models created. Since these parameters vary for each contaminant, a separate model was created for each one. The contaminants include chloroform, 1,1,1-TCA, TCE, and PCE.

Model Dimensions - Assuming that the contaminant source area is located in the area north of Rockton Road, and east of IL 251, the length of the plume (L_p) was set to be 13,000 feet. This is the straight line length to the presumed discharge area at the Rock River. A width of 2,500 feet was used, which is approximately twice the presumed width of the actual plume.

Source Concentration and Source Mass - Since a source has not been identified at the site, the source concentration and source mass were adjusted during modeling to fit the calibration data. These values were altered for each compound.

Hydraulic Conductivity - The value provided in Section 6 of this report is 3.8×10^{-2} cm/sec. This value is based on pressure tests, which are similar to slug tests in that they only approximate the

hydraulic conductivity of the aquifer volume in close proximity to the test well. It is possible that the volume of aquifer close to the borehole has been disturbed during well installation (Kruseman, 1990), or has differing hydraulic properties, and the resulting hydraulic conductivity could be underestimated. The hydraulic conductivity used in modeling was 2.2×10^{-1} cm/sec, which best fit the modeled concentrations to the available data and is a value within the range of hydraulic conductivities for the types of geologic materials found at the site.

Hydraulic Gradient - The value used, 0.0015 ft/ft, is based on the groundwater elevation data presented in Section 6.

Porosity - The value used, 30%, is a typical porosity for sand and gravel mixtures (Fetter, 1994).

Dispersion - For chloroform, 1,1,1-TCA, and TCE, longitudinal dispersivity (Alpha X) was set to 59.9 feet, and was calculated with the Xu and Eckstein (1995) equation:

$$AlphaX = 3.28 \cdot 0.83 \left[\log_{10}\left(\frac{L_p}{3.28}\right) \right]^{2.414}$$

This equation is based on the length of the plume, which equals 13,000 feet. The longitudinal dispersivity was set to 100 feet for the PCE model. Transverse dispersivity was set to one-tenth of the longitudinal dispersivity. Vertical dispersivity was anticipated to be negligible compared to longitudinal and transverse dispersion.

Retardation Factor - This was calculated using a soil bulk density (ρ_b)of 1.8 kg/L (IAC, 1997), a contaminant specific partition coefficient (K_{oc}), a fraction of organic carbon (f_{oc}) of either 0.06% or 0.2% (U.S. EPA, 1998b), and a porosity (n) of 30% in the following equations:

$$K_d = K_{oc} \cdot f_{oc} \qquad R_f = 1 + \frac{K_d \cdot \rho_b}{n}$$

where K_d is the contaminant-specific distribution coefficient. The partition coefficient values were obtained from Table 8-1 and from *Groundwater Chemicals Desk Reference* (Montgomery, 1989). Retardation factors of 1.5, 2.5, 2.1 and 2.0 were used for chloroform, 1,1,1-TCA, TCE, and PCE, respectively.

8.4.3 Calibration Data

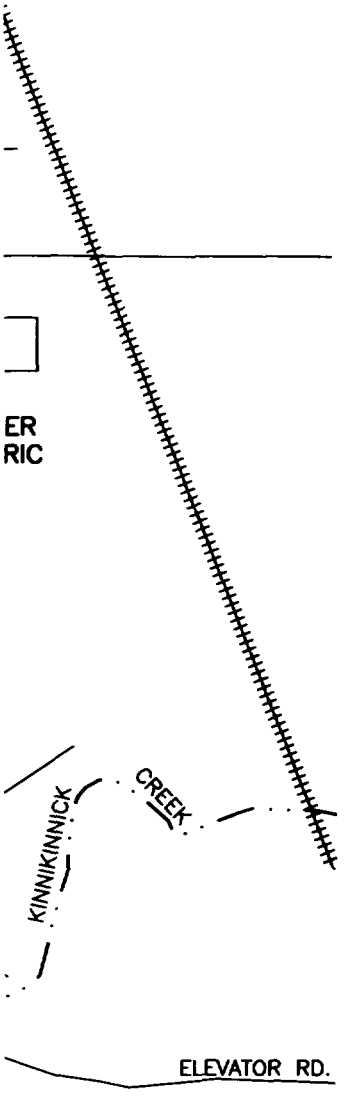
The four contaminants modeled with BIOSCREEN included chloroform, 1,1,1-TCA, TCE, and PCE. Although concentrations of 1,1,1-TCA did not exceed screening levels, this contaminant was used in order to calibrate the model. Table 8-7 presents the data to which the models were calibrated. This table presents the concentrations from the HRS package and this RI, as well as the approximate distance from the source area. The HRS package data were collected about 5 to 6 years prior to the RI data. This time interval was also used to calibrate the models.

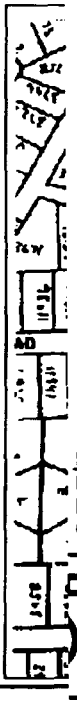
8.4.4 1,1,1-TCA and TCE

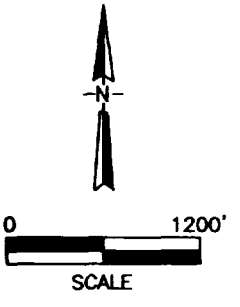
The 1,1,1- TCA and TCE models were calibrated to the data presented in Table 8-7 by altering the hydraulic conductivity, the source concentration, and the source mass. Several attempts were made to match the calibration data using a hydraulic conductivity value of 3.8×10^{-2} cm/sec, as presented in section 6-2, however, the calibration data could not be matched. As discussed previously, the hydraulic conductivity could have been underestimated. Therefore, the hydraulic conductivity was increased until the modeled contaminant distribution matched the calibration data, yet still resulted in using an acceptable value with regard to geologic conditions.

The source concentration and the source mass were adjusted in order to approximate the actual concentrations from the HRS package and this RI. Although an actual source concentration or mass are not known, values were chosen that fitted the available data. The resulting concentration distributions are presented in Appendix F.

The plots for 1,1,1-TCA indicate that the HRS package data and the RI data can be matched at 24 and 30 years respectively. These times do not represent the actual time since a release occurred, but







NOTE:
BASEMAP ADAPTED FROM FIGURE 1 OF THE CONTAMINANT SOURCE EVALUATION – EVERGREEN MANOR SITE, DATED JANUARY 1997, BY CONESTOGA–ROVERS & ASSOCIATES.

FIGURE 7–1

TON DESIGNERS/CONSULTANTS

750 E. Bunker Ct.
Suite 500
Vernon Hills, Illinois
60061

EXTENT OF POSITIVE DETECTIONS IN GROUNDWATER
EVERGREEN MANOR SITE
Roscoe, Illinois

HERNANDD–03/26/01–14:38–J:\CAD93\200\28500

rather the time it took to match the calibration data. Thus, the 24 year output matches the HRS data, and the 30 year output matches the RI data. Similarly, the TCE concentrations were matched to the HRS package and RI data at model output at 20 and 26 years.

Simulations of TCE transport were run beyond the RI time frame to estimate when concentrations would decline below the screening level of 5 ug/L. This result was achieved from the 32 year simulation, or 6 years after the RI. Thus, in about 2006 TCE concentrations at the site are predicted to be below the screening level.

8.4.4 Chloroform

As shown on Table 8-7, only one data point exists for chloroform. Based on the calibrations performed for 1,1,1-TCA and TCE, a model for chloroform was created which matched the concentration at 11943 Wagon Lane during the RI. Only the adsorption, source concentration, and source mass values were adjusted to model chloroform transport. The result, presented in Appendix F, shows that after a simulated time of 15 years, the RI datum is matched.

The simulation was run beyond the 15 years to estimate when the chloroform concentration would decline below the screening level of 0.02 ug/L. This result was achieved with the 18 year simulation, or 3 years after the RI. Thus, chloroform concentrations at the site are predicted to be below the screening level in 2003.

8.4.5 PCE

The PCE model was created by matching three calibration data points from the RI. Dispersion, adsorption, source concentration, and source mass values were adjusted to model PCE transport. The model output at 15 years corresponds to the data collected during the RI. This result is presented as part of Appendix F.

The simulation was run beyond the 15 years to estimate when PCE concentrations would fall below the screening level, 5 ug/L. The 30 year simulation was found to meet this goal. Thus, about 15

years after the RI, in 2015, PCE concentrations at the site are predicted to be below the screening level.

Table 8-1

Physical and Chemical Properties of Constituents of Potential Concern
Evergreen Manor
Roscoe, Illinois

Constituent	Hazard Class	Physical Form	Physical Description	General Chemical Class	Molecular Weight (g/mole)	Log K_{oc}[a]	Log K_{ow}[b]	Density[c] (unitless)	Boiling Point (°C)	Viscosity	Water Solubility (mg/L)	Henry's Law Constant (atm-m³/mol)	Vapor Pressure (mm Hg)	Flash Point (°C)
Volatile Organic Compounds (VOCs)														
Chloroform	Poison	Liquid	Clear, water-white volatile liquid	Solvent	119.38	1.64	1.94	1.4861	61.7	0.542 @ 25°C	8,380 @ 25°C	0.0032	198 @ 25°C	Noncom-bustible
Trichloroethene	Poison	Liquid	Clear, colorless watery liquid w/ chloroform-like odor.	Solvent	131.39	1.98	2.59	1.463	87.0	NA	1,285 @ 25°C	0.010	73.3 @ 25°C	32.2
Tetrachloro-ethene	Poison	Liquid	Colorless liquid w/ sweet etheral odor	Solvent	165.83	2.43	2.53	1.6226	121.2	NA	345 @ 25°C	0.0142	20 @ 25°C	Not Flammable

Notes:

[a] Organic carbon partition coefficient.
[b] Octanol-water partition coefficient.
[c] Density of the compound at 20°C in relation to water at 4°C, unless specified.

NA - Not available.
N/A - Not applicable.

Table 8-2

Migration Characteris ics of Constituents of Potential Concern
vergreen Manor
Roscoe, Illinois

Constituent	Sorption	Biodegradability/Bioc centration/ Biotransform. ion	Photodegradation Rates	Hydrolysis Rates	Chemical Transformations
Volatile Organic Compounds (VOCs)					
Chloroform	Adsorbs most strongly to peat moss, but not at all to sand. Should not be adsorbed readily at the Evergreen Manor site.	Very slow biodegradation aerobic and anaerobic conditions have en reported when microbes have acclin ted to the chemical / there is little to bioconcentration potential a biodegradation products in ude methylene chloride.	Photodegradation is not a significant loss process in aquatic systems, but is slow in atmospheric conditions with hydroxly radicals, with a half-life of 80 days.	Has a negligible rate of hydrolysis.	Degradation (loss of a chloride ion) will result in methylene chloride formation. Minor sources of chloroform release include, but are not limited to, the decomposition of trichloroethylene.
Trichloro-ethene	Very weak adsorption to most soils.	Slow biodegradation in wa r under most conditions / moderate bioc centration in aquatic organisms / biodeg dation products include cis- and trans-1,2-d hloroethene and vinyl chloride.	Direct photolysis does not occur; reaction occurs with hydroxyl radicals in the atmosphere, with a half-life of 5 days.	Hydrolysis does not occur under normal conditions.	Reaction with hydroxyl radicals in the atmosphere produces phosgene, dichloroacetyl chloride, and formyl chloride.
Tetrachloro-ethene	Low to medium mobility in soil is expected; therefore, adsorption should be moderate.	There is no evidence for bi legradation under aerobic conditions, t t slow biodegradation occurs und anaerobic conditions if the microbes ve been acclimated / bioconcentrati n is not expected to be significant i aquatic organisms / biodegradation roducts include trichloroethene, cis- and tr s- 1,2-dichloroethene, methylene hloride, chloroethene, and vinyl ch ride.	Vapor-phase reaction with photochemically produced hydroxyl radicals occurs with a half-life of 2 months.	Not expected to significantly hydrolyze in soil or water.	Slow biodegradation under anaerobic conditions when the organisms have been acclimated yields trichloroethene. Traces of dichloroethylene isomers and vinyl chloride were also found.

Table 8-3
Comparison of Previous Groundwater Data with RI Data
Evergreen Manor, Roscoe, Illinois

Well ID	1,1,1-TCA	TCE	1,2-DCE	PCE
Residential Well Sample Results Supporting HRS Score (1993-1995)				
G 103	19	31	n/a	n/a
G 104	15	23	n/a	n/a
G 105	13	20	n/a	n/a
G 106	14	23	n/a	n/a
G 107	24	35	n/a	n/a
G 108	15	20	n/a	n/a
G 109	10	17	n/a	n/a
G 110	10	18	n/a	n/a
G 112	12	23	n/a	n/a
G 113	23	38	n/a	n/a
G 114	20	36	n/a	n/a
G 115	15	27	n/a	n/a
G 116	18	27	n/a	n/a
G 117	12	24	n/a	n/a
G 118	n/a	19	n/a	n/a
G 119	29	19	n/a	n/a
G 120	14	24	n/a	n/a
G 121	10	18	n/a	n/a
G 122	17	25	n/a	n/a
G 123	22	23	n/a	n/a
G 124	17	30	n/a	n/a
G 125	n/a	19	n/a	n/a
G 129	14	25	n/a	n/a
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
G 131	22	20	n/a	n/a
G 132	12	18	n/a	n/a
G 134	16	25	n/a	n/a
G 135	21	29	n/a	n/a
G 136	24	29	n/a	n/a
G 137	20	27	n/a	n/a
G 138	12	23	n/a	n/a
G 139	n/a	11	n/a	n/a
G 141	10	18	n/a	n/a
G 142	33	40	n/a	n/a
G 143	37	34	n/a	n/a
G 144	34	35	n/a	n/a
G 146	21	28	n/a	n/a
G 147	11	22	n/a	n/a
G 148	22	31	n/a	n/a
G 149	13	22	n/a	n/a
G 152	18	6	2	2
G 153	21	15	5	4
G 154	18	22	8	5
G 155	21	10	3	2

Table 8-3
Comparison of Previous Groundwater Data with RI Data
Evergreen Manor, Roscoe, Illinois

Well ID	1,1,1-TCA	TCE	1,2-DCE	PCE
Residential Well Sample Results Supporting HRS Score (1993-1995)				
G 156	21	6	2	2
G 157	17	6	2	2
G 167	22	12	3	2
G 168	16	13	3	n/a
G 170	30	6	2	n/a
G 184	17	10	2	4
G 188	11	2.1	n/a	n/a
G 190	14	27	5.3	n/a
G 192	1.6	6	n/a	n/a
G 196	28	5.7	n/a	n/a
G 202	19	7.3	1	n/a
G 203	20	8.2	1.2	n/a
G 206	34	15	n/a	n/a
G 212	21	n/a	n/a	n/a
G 219	5.1	11	1.4	n/a
G 229	19	20	2.8	n/a
G 241	26	n/a	n/a	n/a
G 247	20	31	4.3	n/a
G 248	25	38	4.7	n/a
G 251	n/a	n/a	3.8	n/a
G 257	n/a	5.4	n/a	n/a
G 260	12	12	1.2	n/a
G 268	18	13	1.9	n/a
G 270	14	29	4	n/a
G 276	25	23	3.1	n/a
G 283	16	11	1.6	n/a
G 290	17	22	3.1	n/a
G 293	14	12	1.4	n/a
G 296	18	19	2.5	n/a
G 304	19	25	n/a	n/a
G 316	16	31	4.4	n/a
G 317	29	24	2.8	n/a
G 318	9.7	17	2.2	n/a
G 320	11	5.3	0.6	n/a
G 322	3.6	11	2.3	n/a
G 338	16	23	6.4	4
G 357	14	12	1.6	n/a
G 358	21	28	3.4	n/a
G 360	16	28	4.1	n/a
G 362	26	27	4	n/a
G 364	16	11	1.8	n/a
G 365	16	17	2.7	n/a
Average:	**18**	**20**	**3**	**3**

Table 8-3
Comparison of Previous Groundwater Data with RI Data
Evergreen Manor, Roscoe, Illinois

Well ID	1,1,1-TCA	TCE	1,2-DCE	PCE
Residential Well Sample Results from RI (2000)				
RW 3	2	ND	ND	ND
RW 4	2	5	1	2
RW 4	2	6	2	2
RW 7	5	0.7	ND	ND
RW 8	0.9	ND	ND	ND
RW 11	1	ND	ND	ND
RW 11	1	ND	ND	ND
RW 11	1	ND	ND	ND
RW 11	1	ND	ND	ND
RW 19	1	4	ND	0.9
RW 19	0.6	4	ND	0.9
Average:	**1.6**	**3.9**	**1.5**	**1.5**
Monitoring Well Sample Results Supporting HRS Score (1994-1995)				
G 101D	n/a	3	n/a	n/a
G 103S	3	n/a	n/a	40
G 104S	12	0.9	n/a	n/a
G 105D	8.9	15	5.7	3.2
G 105D	9	15	5	4
G 106S	1	3	n/a	n/a
G 107D	8	n/a	n/a	11
G 108D	7	n/a	n/a	3
G 109D	8	3	6	7
G 110S	4	2	n/a	n/a
G 113	n/a	n/a	n/a	2
G 114	3	n/a	n/a	n/a
Average:	**6.4**	**6.0**	**5.6**	**10**
Monitoring Well Sample Results from RI (2000)				
MW 101D	ND	2	ND	ND
MW 103D	3	ND	ND	0.5
MW 103S	ND	ND	ND	9
MW 104D	1	ND	ND	ND
MW 104D	1	ND	ND	ND
MW 104S	2	ND	ND	ND
MW 105D	2	2	1	3
MW 105D	3	3	2	4
MW 105S	2	2	1	3
MW 108D	ND	ND	ND	0.6
MW 108D	ND	ND	ND	0.7
MW 108D	ND	ND	ND	0.6
MW 112	2	ND	ND	ND
Average:	**2.0**	**2.3**	**1.3**	**2.7**

n/a - Data not available, not analyzed, or compound not detected.

ND - Compound not detectd

Table 8-4
Comparison of Sele t Detected Constituents in Groundwater
R sidential Wells - VOCs
Everg en Manor, Roscoe, Illinois

Sampling Event:	RI	RI	RI	HRS	RI		RI	RI	RI	RI	RI	RI	RI	HRS
Sample ID:	RW-03	RW-04	RW04-01	G109	RW-(		RW-08	RW-11	RW-11DUP	RW11-01	RW11-01DP	RW-19	RW-19DUP	G110
Sample Number:	—	—	EABQ4	—	—		—	—	—	EABQ5	EABQ6	—	—	—
Sample Date:	6/5/00	6/5/00	6/5/00	11/9/93	6/5/0		6/5/00	6/5/00	6/5/00	6/5/00	6/5/00	6/6/00	6/6/00	11/9/93
Address:	11990 Wagon La.	11990 Blue Spruce	11990 Blue Spruce	11990 Blue Spruce	12031 W La. C	on	11943 Wagon La.	4234 Valerie Rd.	4234 Valerie Rd.	4234 Valerie Rd.	4234 Valerie Rd.	11974 Blue Spruce Dr.	11974 Blue Spruce Dr.	11974 Blue Spruce Dr.
Laboratory:	ESAT	ESAT	MITKEM	Unknown	ESA		ESAT	ESAT	ESAT	MITKEM	MITKEM	ESAT	ESAT	Unknown
Units	ug/L	ug/L	ug/L	ug/L	ug/l		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
PARAMETER														
1,1,1-Trichloroethane	2 J	2 J	2.00	10	5 J		0.9 J	1 J	1 J	1.00	1.00	1 J	0.6 J	10
Cis-1,2-Dichloroethene	ND	1 J	2.00	n/a	NL		ND	ND	ND	ND	ND	ND	ND	n/a
Tetrachloroethene	ND	2 J	2.00	n/a	NL		ND	ND	ND	ND	ND	0.9 J	0.9 J	n/a
Trichloroethene	ND	5 J	6.00	17	0.7		ND	ND	ND	ND	ND	4 J	4 J	18

Notes and Qualifier Flags

ND - Constituent not detected above method detection limit.
J - Concentration reported is an estimated value.
n/a - Constituent not presented in HRS package; constituent is presumed either not analyzed, or . alysis resulted in a non-detect.

Table 8-5
Comparison of Select Detected Constituents in Groundwater
Mo itoring Wells - VOCs
Evergre n Manor, Roscoe, Illinois

Sampling Event:	RI	HRS	RI	RI	RI	RI	RI	RI	HRS
Sample ID:	MW101D	G101D	MW101S	MW102D	MW102S	MW103D	MW103D-DL	MW103S	G103S
Sample Number:	—	—	—	—	—	—	—	—	—
Sample Date:	5/30/00	2/23/95	5/30/00	6/1/00	6/1/00	5/31/00	5/31/00	5/31/00	2/21/95
Laboratory:	ESAT	—	ESAT	ESAT	ESAT	ESAT	ESAT	ESAT	—
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
PARAMETER									
1,1,1-Trichloroethane	ND	n/a	ND	ND	ND	3 J	ND	ND	3
Cis-1,2-Dichloroethene	ND	n/a	ND	ND	ND	ND	ND	ND	n/a
Tetrachloroethene	ND	n/a	ND	ND	ND	0.5 J	ND	9 J	40
Trichloroethene	2 J	3	ND	ND	ND	ND	ND	ND	n/a

Notes and Qualifier Flags

ND - Constituent not detected above the method detection limit.

J - Concentration reported is an estimated value.

DL - Designates sample was diluted.

n/a - Constituent not presented in HRS package; constituent is presumed either not a lyzed, or analysis resulted in a non-detect.

Table 8-5
Comparison of Selected Detected Constituents in Groundwater
Monitoring Wells - VOCs
Evergreen Manor, Roscoe, Illinois

Sampling Event:	RI	RI	RI	HRS	RI	RI	HRS	HRS	RI
Sample ID:	MW104D	MW104D-DUP	MW104	G104S	MW105D	MW105D-01	G105D	G105D	MW105S
Sample Number:	—	—	—	—	—	EABX1	—	—	—
Sample Date:	6/2/00	6/2/00	6/2/00	2/22/95	6/2/00	6/2/00	3/23/94	2/22/95	6/2/00
Laboratory:	ESAT	ESAT	ESAT	—	ESAT	MitKem	—	—	ESAT
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
PARAMETER									
1,1,1-Trichloroethane	1 J	1 J	2 J	12	2 J	3	8.9	9	2 J
Cis-1,2-Dichloroethene	ND	ND	4 J	n/a	1 J	2	5.7	5	1 J
Tetrachloroethene	ND	ND	1 J	n/a	3 J	4	3.2	4	3 J
Trichloroethene	ND	ND	1 J	0.9	2 J	3	15	15	2 J

Notes and Qualifier Flags

ND - Constituent not detected above the method detection limit.

J - Concentration reported is an estimated value.

DL - Designates sample was diluted.

n/a - Constituent not presented in HRS package; constituent is presumed either not analyzed, or analysis resulted in a non-detect.

Table 8-5
Comparison of Select)etected Constituents in Groundwater
Mon toring Wells - VOCs
Evergree ı Manor, Roscoe, Illinois

Sampling Event:	RI	RI	RI	HRS	RI	RI	RI	HRS	RI
Sample ID:	MW108D	MW108D-01	MW108D-DUP	G108D	MW108S	MW110D	MW110S	G110S	MW112
Sample Number:	—	EABW8	—	—	—	—	—	—	—
Sample Date:	6/1/00	6/1/00	6/1/00	2/21/95	6/1/00	6/1/00	6/1/00	2/23/95	6/2/00
Laboratory:	ESAT	MitKem	ESAT	—	ESAT	ESAT	ESAT	—	ESAT
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
PARAMETER									
1,1,1-Trichloroethane	ND	ND	ND	7	ND	ND	ND	4	2 J
Cis-1,2-Dichloroethene	ND	ND	ND	n/a	ND	ND	ND	n/a	ND
Tetrachloroethene	0.6 J	0.7 J	0.6 J	3	ND	ND	ND	n/a	ND
Trichloroethene	ND	ND	ND	n/a	ND	ND	ND	2	ND

Notes and Qualifier Flags

ND - Constituent not detected above the method detection limit.

J - Concentration reported is an estimated value.

DL - Designates sample was diluted.

n/a - Constituent not presented in HRS package; constituent is presumed either not analy. d, or analysis resulted in a non-detect.

Table 8-6
BIOSCREEN Model Inputs and Results
Evergreen Manor, Roscoe, Illinois

Compound Modeled	Chloroform	1,1,1-TCA	TCE	PCE
Model Dimensions				
Length (ft)	13,000	13,000	13,000	13,000
Width (ft)	2,500	2,500	2,500	2,500
Source				
Width (ft)	500	500	500	500
Thickness (ft)	40	40	40	40
Concentration (mg/L)	0.006	0.045	0.06	0.022
Mass (kg)	0.15	35	50	60
Hydraulic Conductivity (cm/sec)	2.2E-01	2.2E-01	2.2E-01	2.2E-01
Hydraulic Gradient (ft/ft)	0.0015	0.0015	0.0015	0.0015
Porosity (dimensionless)	0.3	0.3	0.3	0.3
Seepage Velocity (ft/year)	1,138	1,138	1,138	1,138
Longitudinal Dispersion (ft)	59.9	59.9	59.9	100
Transverse Dispersion (ft)	6.0	6.0	6.0	10
Vertical Dispersion (ft)	1E-99	1E-99	1E-99	1E-99
Fraction Organic Carbon (mg/kg)	0.002	0.002	0.002	0.0006
Partition Coefficient (K_{oc}) (L/kg)	43.7	125.9	95.5	269.2
Distribution Coefficient (K_d) (dimensionless)	0.087	0.25	0.19	0.16
Soil Bulk Density (r_b) (kg/L)	1.8	1.8	1.8	1.8
Retardation Factor (dimensionless)	1.5	2.5	2.1	2.0
Estimated Years to Reach Screening Level	5	Not Applicable	6	15

Table 8-7
BIOSCREEN Calibration Data
Evergreen Manor, Roscoe, Illinois

Contaminant	Sample Location	Distance from Source (ft)	HRS Data (ug/L)	RI Data (ug/L)
Chloroform		11200	—	0.9 J
1,1,1-TCA		10,700	10	2
		8,850	9	3
TCE		10,700	17	6
		8,850	15	3
PCE		10,700	—	2
		2,700	—	9
		8,850	—	4

Notes:

J - Approximate concentration.

SECTION 9

HUMAN HEALTH RISK ASSESSMENT

9.1 INTRODUCTION

In accordance with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), baseline human health and ecological risk assessments were prepared to evaluate the potential human health and environmental impacts associated with the Evergreen Manor site in Roscoe, Winnebago County, Illinois under a no-action alternative (i.e., in the absence of remedial [corrective] action). Information and data collected as part of the RI/FS activities serves as the basis for these tasks. Exposure to volatile organic compounds (VOCs) in groundwater is the primary focus of this risk assessment.

9.1.1 Objectives

The objectives of the baseline human health risk assessment for the Evergreen Manor site are as follows:

- Estimate potential risk to people contacting site-related chemicals of potential concern(COPCs) under scenarios of current and plausible future land use.
- Provide an analysis of risks and help determine the need for remedial actions at the site.
- Identify specific media and areas associated with unacceptable risk, if applicable.

9.1.2 Risk Assessment Approach

The methodology used to assess the potential human health risks at the Evergreen Manor site draws upon the guidance set forth in the following documents:

- *Risk Assessment Guidance for Superfund, Human Health Evaluation Manual, Part A* (U.S. EPA, 1989).
- *Risk Assessment Guidance for Superfund, Human Health Evaluation Manual, Part B* (U.S. EPA, 1991a).
- *Risk Assessment Guidance for Superfund, Human Health Evaluation Manual, Part D* (U.S. EPA, 1998).

9.1.3 Risk Assessment Organization

The Human Health risk assessment is organized into the following components:

- Hazard Identification—Identification of major contaminants of concern based on a review of available information on the hazardous substances present at the site. COPCs were selected based on their intrinsic toxicological properties as part of a dose-response assessment.
- Exposure Assessment—Critical exposure pathways were identified and analyzed. The proximity of contaminants to exposure pathways and their potential to migrate into critical pathways was also assessed. Potential receptors were identified and characterized. The exposure assessment then identifies the magnitude of actual or potential human exposures, the frequency and duration of these exposures, and the exposure routes. The assessment also includes an evaluation of the likelihood of such exposures occurring, and provides the basis for the development of acceptable exposure levels. In developing the exposure assessment, reasonable maximum estimates of exposure for both current and future land used conditions were developed.
- Toxicity Assessment—Chemical-specific toxicity information is provided for the chemicals of potential concern.

- Risk Characterization—Risk characterization combines chemical-specific toxicity information with quantitative and qualitative information from the exposure assessment. This information is compared to measured contaminant exposure levels predicted through environmental fate and transport modeling. These comparisons are used to determine whether concentrations of contaminants at or near the sites are affecting, or could potentially affect, human health. An uncertainty analysis is also included in this section which presents critical assumptions, such as background concentrations and conditions, that are considered uncertainties in this report.

9.2 CONTAMINANT IDENTIFICATION

In this section, the available information on the hazardous substances at the site is evaluated, the chemicals detected in the environmental media (i.e., groundwater, sediment, and surface water) sampled at the Evergreen Manor site are summarized, and the COPCs are identified.

9.2.1 Contaminant Characterization

Media investigated during the Evergreen Manor Remedial Investigation (RI) included groundwater, sediment, and surface water. The following is a summary of the investigation results that are described in more detail in Section 5. Figures 4-1 and 4-2 present the groundwater sample locations. Figure 4-3 presents the sediment and surface water sample locations.

The geology underlying the site was characterized using cone penetration testing (CPT) methods. Groundwater quality and flow conditions were assessed to evaluate areal and vertical extent of contaminant migration and to determine the concentrations of the contaminants in groundwater. Depth to water in monitoring wells was measured to determine the direction of groundwater flow and hydraulic gradient. Residential wells, monitoring wells, and CPT boreholes were sampled to determine groundwater quality within the unconfined sand and gravel aquifer.

Twenty-two groundwater samples were obtained from residential wells to determine the extent of contamination and the concentrations of contaminants in the aquifer. All residential well samples were analyzed for VOCs. In addition, six of the residential wells were analyzed for orthophosphate, ammonia, nitrate, nitrite, COD, sulfide, and sulfate parameters to evaluate natural attenuation characteristics across the lateral extent of the expected plume. Groundwater samples were collected at 10 CPT locations to determine if groundwater has been impacted by contamination and to evaluate the lateral and vertical extent of contamination. Discreet samples were taken at approximately 10 foot intervals for the purpose of determining the zone containing the maximum concentrations of VOC contamination. Fifteen monitoring wells previously installed by IEPA were also sampled for VOCs. Eight of these 15 monitoring wells were sampled for natural attenuation parameters to determine groundwater quality and aid in determining the extent of contamination.

Six sediment samples were collected during the field investigation -- three sediment samples were collected from the Rock River and three sediment samples were collected from Dry Creek. The sediment samples were collected to determine if site contaminants have been discharged or have migrated into the river and creek. The sediment samples were collected in areas that sediments are readily deposited and were collected within approximately 5 feet of the shore. The six investigative samples from Rock River and Dry Creek were submitted for VOC and TOC analysis.

Six surface water samples were collected during the field investigation -- three surface water samples were collected from the Rock River and three surface water samples were collected from Dry Creek. The surface water samples were collected to determine if site contaminants were migrating off-site via surface water runoff or being discharged from groundwater. Surface water samples were collected prior to collection of sediment samples at approximately the same locations as sediment samples. Surface water samples were collected within 5 feet of the shore and just below the water surface. The sampling progressed from downstream to upstream locations to minimize the impact

of sediment disturbance and/or cross contamination of samples. The six investigative samples were submitted for VOC analysis.

9.2.2 Data Evaluation

Chemical analyses were performed in a mobile field laboratory operated by the ESAT Region V Mobile Laboratory. A stationary laboratory operated by Chemtech of Englewood, New Jersey, a Contract Laboratory Program (CLP) laboratory, performed confirmatory CLP laboratory analysis on 10 percent of the water and sediment VOC samples. All analyses were performed according to the U.S. EPA-approved Quality Assurance Project Plan (QAPP) developed for the Evergreen Manor site (WESTON, 2000a). All CLP generated data was validated by the U.S. EPA Region V Superfund Division Field Services Section Quality Assurance Reviewer. In addition, WESTON's data reviewers conducted a systematic review of the data for compliance with established QC criteria. All SAS analytical data was also reviewed and validated by WESTON. The reader is referred to the RI/FS Work Plan and QAPP (WESTON, 2000b and 2000a) for detailed information on data quality.

All environmental samples (i.e., groundwater, surface water, and sediment) collected during the Site Characterization were analyzed for VOCs. Field duplicate samples were collected at selected locations at a one per 10 frequency. The chemicals found in each environmental medium are summarized by frequency of detection (i.e., the ratio of the number of samples in which the chemical was detected to the number of samples available) and the minimum and maximum detected concentrations in Table 2, "Occurrence, Distribution, and Selection of Chemicals of Potential Concern," provided in Appendix A.

9.2.3 Identification of Constituents of Potential Concern

The quantitative assessment of exposure, and consequently risk, for a site is based on those chemicals considered as COPCs for the site. The COPCs are a subset of all the chemicals positively identified at a site and are those constituents associated with site processes and measured above background levels. The risks associated with the COPCs are expected to be more significant than those associated with the other less toxic and less prevalent chemicals at the site. The list of COPCs evaluated in a human health risk assessment may not be the same as that evaluated in an ecological risk assessment.

Chemical COPCs identified at the Evergreen Manor site are VOCs. In general, the list of chemical COPCs evaluated in the human health risk assessment includes those that are:

- Positively detected in at least one CLP sample in a given medium, including: (a) chemicals with no qualifiers attached (excluding samples with unusually high detection limits), and (b) chemicals with qualifiers attached that indicate known identities but unknown or estimated concentrations (e.g., J-qualified data).

- Detected at levels significantly elevated above levels of the same chemicals detected in associated blank samples.

- Detected at levels above Region 9 soil risk-based screening levels (U.S. EPA, 1999b), which are associated with a cancer risk of 1E-06 (one-in-one-million) and a systemic hazard quotient (HQ) of 1. In order to provide a more conservative screening and to account for similar toxic endpoints among noncarcinogenic compounds, a HQ of 0.1 was used in screening noncarcinogenic chemicals and a risk level of 1E-07 was used in screening carcinogenic chemicals, based on U.S. EPA (U.S. EPA 1993b) guidance. Where risk-based concentrations are available for cancer and non-cancer endpoints and both ingestion and inhalation exposure routes, the lower (i.e., most stringent) value was used for the screening comparison.

The selection of COPCs for each environmental medium evaluated at Evergreen Manor is presented in Table 2, "Occurrence, Distribution, and Selection of Chemicals of Potential Concern," which is

provided in Appendix A. Since VOCs were not detected above method detection limits in surface water at locations adjacent and downgradient of the site, surface water is not evaluated further in this risk assessment.

VOCs were detected in sediment at several locations adjacent to the site; however, the constituent detected, methyl acetate, does not have any established toxicity data. The only other VOCs detected in sediment were detected at locations upgradient of the site. Therefore, the sediment medium is not evaluated further in the risk assessment.

9.3 EXPOSURE ASSESSMENT

The purpose of the exposure assessment is to estimate the magnitude of human exposure to the chemicals found in environmental media at the Evergreen Manor site. The results of the exposure assessment are subsequently combined with the chemical-specific toxicity information to quantitatively estimate the human health risks associated with chemical exposure at this site. The identification of actual or potential pathways through which human receptors could be exposed to chemicals in groundwater at the site includes identification and characterization of the site and the potentially exposed populations. Exposure to surface water and sediment in the Rock River and Dry Creek were not evaluated further in this risk assessment because contaminants were not detected in surface water, contaminants were detected at upgradient sediment sampling locations only, or toxicity data is not available for the contaminant detected in sediment adjacent to the site. After exposure pathways have been identified, daily intakes of the COPCs are quantified using standard exposure algorithms.

9.3.1 Characterization of Exposure Setting

The first step in evaluating exposure is to characterize the site with respect to its physical characteristics as well as the human populations on and near the site. Information gathered during this step will support the identification of exposure pathways and the determination of exposure assumptions.

The area in the vicinity of the site consists of a mixture of land uses including residential, commercial, and light and heavy industrial. Based on the 1990 census, there are 2,079 people living within the Village of Roscoe. The site includes four residential subdivisions and is located approximately 1.5 miles northwest of the Roscoe city limits. Nearby development includes Roscoe Rock & Sand, Inc., a gravel pit and concrete mixing facility, to the northeast of the site, and an industrial park approximately 2 miles to the northeast of the site. The Hononegah Forest Preserve is located to the west and agricultural fields to the north and east of the site. Additional information on the physical setting of the site and surrounding area including climate, vegetation, soil type, surface hydrology, and groundwater hydrology is presented in Section 3.

The Evergreen Manor site includes four residential subdivisions. Based on current site conditions and site ownership, the baseline risk assessment evaluates residents as the current receptor group at this site. The risk assessment also evaluated future residential and commercial/industrial use of the site. Thus, potential risks were evaluated for current/future residential and future commercial/industrial receptors.

9.3.2 Identification of Exposure Pathways

An exposure pathway generally consists of four elements: (1) a source and mechanism of contaminant release, (2) a retention or transport medium, (3) a point of potential human contact with

the contaminated medium (referred to as the exposure point), and (4) an exposure route (i.e., ingestion, dermal contact, or inhalation) at the exposure point (U.S. EPA, 1989). Table 1, "Selection of Exposure Pathways," provided in Appendix A integrates and summarizes the information concerning source areas, chemical migration pathways, receptor populations, and exposure routes into a combination of potential human exposure pathways for the Evergreen Manor site. The following subsections describe the process used to identify and select exposure pathways for quantitative analysis.

Source Area

As previously discussed, the Evergreen Manor site includes four residential subdivisions. The site area was used as farmland prior to development. The Hononegah Heights subdivision was developed between 1940 and 1964; the Tresemer subdivision was developed between 1972 and 1974; the Olde Farm subdivision was developed between 1976 and 1979; and the Evergreen Manor subdivision was developed between 1986 and 1988. The source area was identified in an Action Memorandum (U.S. EPA, 1999a) as a small industrial/commercial area at the intersection of Rockton Road and Illinois Route 251. The specific source(s) of the contamination has not been discovered. The IEPA has identified four potentially responsible parties based on sampling results and historic operations.

Chemical Migration Pathways

This subsection briefly addresses the fate of chemicals measured in groundwater at the site, their potential to be transported to other environmental media, and their potential to migrate off site. After a chemical is released into the environment, it may be transported (e.g., advected downstream in water), physically transformed (e.g., volatilized), chemically transformed (e.g., oxidation/reduction), biologically transformed (e.g., biodegradation), or bioaccumulated in one or more media (U.S. EPA,

1989). A goal of fate analysis is to identify other (non-source) environmental media and off-site areas potentially affected by chemical migration.

Several VOCs were measured above screening levels in groundwater. These VOCs could migrate toward downgradient receptor areas or into other environmental media (e.g., the Rock River or Dry Creek). No VOCs were measured in surface water. VOCs measured in sediment were either at upgradient locations, or did not have toxicity data. As the VOCs in groundwater reach a surface waterbody, they are expected to readily volatilize to the atmosphere. However, volatile contaminants in groundwater that are used as a household water supply can readily enter the enclosed atmosphere of a residence during dishwashing, clothes laundering, and showering.

Exposure Points and Exposure Routes

Two receptor groups were assumed to be exposed to constituents in environmental media at the site:

- Current/future on-site resident (adult and young child)
- Future commercial/industrial worker (adult)

The site is currently occupied by residences and surrounded by various commercial and industrial businesses. Residents (adults and young children) and commercial/industrial workers from nearby businesses use groundwater as their potable water supply. These receptor groups may potentially be exposed to COPCs in groundwater. There are three primary exposure routes for chemicals in water: ingestion, dermal absorption, and inhalation. Inhalation of volatile chemicals is considered routinely only for chemicals with a Henry's Law constant of 1×10^{-5} atm-m^3/mole or greater and a molecular weight of less than 200 g/mole (U.S. EPA, 1991a).

Exposure Pathways

For each receptor group, the following exposure pathways were quantitatively evaluated in the risk assessment:

- Ingestion of contaminated groundwater.
- Dermal absorption of chemicals from groundwater.
- Inhalation of volatiles from groundwater.

9.3.3 Quantification of Exposure

The degree of receptor exposure that occurs through each exposure pathway is determined by behavioral, chemical, and physiological factors. Behavioral factors affecting exposure would include the amount of time spent on-site, the activities engaged in while on-site, and the amount and type of clothing worn. Chemical factors affecting the degree of exposure include the extent to which a chemical is absorbed through the skin and gastrointestinal tract (i.e., the absorption efficiency). Physiological factors affecting exposure would include the ability of the body to metabolize and eliminate the chemical(s). To quantify exposures in the risk assessment process, it is necessary to make assumptions concerning these factors in the absence of specific, detailed information. These assumptions are represented by a series of exposure parameters that quantify the magnitude, frequency, and duration of the exposure. In addition, the quantification of exposure requires estimates of chemical concentrations to which the receptor is exposed.

Exposure Point Concentrations

The exposure point concentration is the concentration of a chemical to which a receptor may be exposed. The exposure point concentration for each chemical in each medium is intended to represent a reasonable maximum estimate of the concentration a receptor is likely to be exposed to over time. Groundwater is generally evaluated at the center of any recognizable plume(s) of COPCs

in potential sources of groundwater. A distinct plume was not recognizable at this site; therefore, the maximum concentration of each COPC was used as the exposure point concentration for groundwater.

Exposure point concentrations for groundwater water are summarized in Table 3, "Medium-Specific Exposure Point Concentration Summary", which is provided in Appendix A.

Reasonable Maximum and Central Tendency Exposure

To evaluate exposures over the range of possible conditions that may exist at the Evergreen Manor site, two hypothetical degrees of exposure are considered in this study following U.S. EPA (U.S. EPA, 1992c; 1998) guidance. These degrees of exposure are reasonable maximum exposure (RME) and central tendency (CT). The RME is the highest exposure that is reasonably expected to occur at a site; the CT is intended to represent more typical (i.e., central tendency) exposure conditions. In evaluating RME and CT scenarios, the exposure point concentration remains the same, while the exposure parameters are adjusted to reasonable maximum and central tendency values.

Exposure Algorithms

U.S. EPA has developed exposure algorithms for use in calculating chemical intakes through the exposure pathways and routes that are relevant for this site. These algorithms combine chemical exposure point concentrations with pathway- and route-specific parameters to produce daily chemical intakes in terms of the milligrams of chemical taken into the body per kilogram of body weight per day (mg/kg-day). The following subsections discuss the exposure pathways and routes through which receptors are assumed to be exposed to site contaminants, and present the exposure algorithms and exposure parameters that were used in this risk assessment.

The basic mathematical models used to calculate intakes are presented in the following subsections. Each model defines the exposure variables used in estimating the intake, and includes the assumptions (e.g., exposure parameters) used in the model. In general, the exposure parameters used are standard values recommended by U.S. EPA guidance (U.S. EPA, 1989; 1991c; 1997). When available, site-specific exposure information was used.

Water Pathway

The current/future resident and future commercial/industrial worker may be exposed to groundwater used as a potable water supply The estimated daily intakes that result from groundwater exposure are presented in Appendix A.

Ingestion of Water

Chemical intake through water ingestion and dermal absorption is calculated as follows:

$$\text{Intake} = C_w \times IR_w \times EF \times ED / (BW \times AT)$$

where:

Intake	=	Estimated water intake (mg/kg-day)
C_w	=	Chemical concentration in water (mg/L)
ED	=	Exposure duration (yrs)
EF	=	Exposure frequency (days/yr)
IR_w	=	Ingestion rate (L/day)
BW	=	Body weight (kg)
AT	=	Averaging time (days)

Dermal Absorption from Water

$$\text{Intake} = C_w \times SA \times PC \times 1L/1000\ cm^3 \times ET \times EF \times ED / (BW \times AT)$$

where:

Intake	=	Estimated water intake (mg/kg-day)
C_w	=	Chemical concentration in water (mg/L)
SA	=	Surface area available for contact (cm^2)

PC	=	Permeability constant (cm/hr)
ET	=	Exposure time (hours/day)
EF	=	Exposure frequency (days/yr)
ED	=	Exposure duration (yrs)
IRw	=	Ingestion rate (L/day)
BW	=	Body weight (kg)
AT	=	Averaging time (days)

Inhalation of Organic Vapors from Groundwater

For organic compounds detected in groundwater, vapor inhalation intake is calculated as:

$$\text{Intake} = C_w \times EF \times IH \times K \times ED / (BW \times AT)$$

where:

Intake	=	Estimated daily intake via vapor inhalation (mg/kg-day)
C_w	=	Chemical concentration in water (mg/L)
ED	=	Exposure duration (yrs)
EF	=	Exposure frequency (days/yr)
IH	=	Inhalation rate (m^3/day)
K	=	Volatilization factor (unitless)
BW	=	Body weight (kg)
AT	=	Averaging time (days)

Exposure Parameters

Values used for daily intake calculations are presented in Table 4, "Values Used for Daily Intake Calculations," and are provided in Appendix A.

Residential and commercial/industrial worker exposure to groundwater through drinking water ingestion, dermal absorption, and inhalation were considered. Exposures through drinking water may occur by a variety of mechanisms, including ingestion of drinking water and ingestion of foods prepared with or in water. The reasonable maximum ingestion rate for potable water is established at 2 L/day for an adult and 1 L/day for a child (U.S. EPA, 1989). The average drinking water ingestion rate is 1.4 L/day for an adult and 0.7 L/day for a child (U.S. EPA, 1997). For commercial/industrial workers, the reasonable maximum water ingestion rate is 1 L/day while the

average ingestion rate is 0.7 L/day. These amounts include water consumed in the form of other beverages and the ingestion of foods prepared in or with water.

Certain non-potable uses of water may result in skin contact and dermal absorption of waterborne contaminants. For bathing and swimming scenarios, 75 to 100% of the skin surface is exposed. The total adult body surface area can vary from 17,000 to 23,000 cm^2 for an adult. A mean value of 20,000 cm^2 and a reasonable maximum value of 23,000 cm^2 are recommended as default values by U.S. EPA (1992a). The total body surface area for a 1 to 6-year old child is 8,538 cm^2 for the 95th percentile and 7,314 cm^2 for the 50th percentile (U.S. EPA, 1997). Shower times have been found to range from 10 to 35 minutes (U.S. EPA, 1997). The permeability constants for the organic COPCs are listed in Table 9-1.

Indoor inhalation of volatiles is relevant only for chemicals that easily volatilize, i.e., chemicals with a Henry's law constant greater than 10^{-5} atm-m^3/mole and a molecular weight of less than 200 g/mole. Andelman (1990, as cited in U.S. EPA, 1991c), derived an equation that relates the concentration of a contaminant in household water and the average concentration of the volatilized contaminant in air. The volatilization constant is 0.0005 x 1000 L/m^3, where the 1000 L/m^3 conversion factor is used so that the resulting air concentration is expressed as mg/m^3. The indoor air inhalation rate for an adult is 15 m^3/day (U.S. EPA, 1991c) and the indoor inhalation rate for a young child is 8.7 m^3/day (U.S. EPA, 1997).

An exposure frequency (EF) of 350 days per year is the default reasonable maximum value for residents; it was also used for the average scenario. This EF is based on the common assumption that workers take two weeks of vacation per year to support a value of 15 days per year spent away from home (U.S. EPA, 1991a). An EF of 250 days per year is the default value for commercial/industrial workers for both the RME and CT scenarios. Again, it is assumed that a worker takes two weeks of vacation per year (U.S. EPA, 1991a).

The national upperbound time at one residence is 30 years (U.S. EPA, 1991c) and the average time at one residence is 9 years (U.S. EPA, 1997). The exposure duration for an adult was adjusted to 24 years for the RME scenario and 7 years for the CT scenario to account for differences in ingestion rate and body weight between children and adults. These values were applied for the adult resident. The reasonable maximum ED for a 1- through 6-year-old child is 6 years; an average exposure duration of 2 years was used, which was estimated based on the ratio of the average to maximum adult exposure duration. For the commercial/industrial worker, the ED is assumed to be an average of 9 years (U.S. EPA, 1992b) and a maximum of 25 years (U.S. EPA, 1991c).

The value for body weight (BW) is the average body weight over the exposure period. An average BW is used because, when combined with other variable values, it is believed to result in the reasonable maximum exposure. Incorporating a higher BW with the same intake rate would result in lower exposure than the reasonable maximum. In addition, using an average BW rather than a reasonable maximum is recommended because the available toxicity data are based on average body weight. The recommended average BW for an 18- to 75-year old adult is 70 kg (U.S. EPA, 1991c). The recommended average BW for a 1- through 6-year-old is 15 kg (U.S. EPA, 1991c). An average BW is applied for both the RME and CT scenarios.

The averaging time (AT) is the period over which exposure is averaged. For non-carcinogenic effects, AT is equal to exposure duration (ED). For carcinogens, AT is equal to a 70-year lifetime (U.S. EPA, 1991c).

9.4 TOXICITY ASSESSMENT

A toxicity assessment presents the appropriate toxicity values and the weight of evidence for the toxicity of each of the COPCs. Applicable human toxicity values are identified for each COPC for the relevant exposure routes. These toxicity values include reference doses (RfDs) for evaluating

potential non-carcinogenic health effects and cancer slope factors (CSFs) for evaluating carcinogenic risks.

Toxicity criteria were obtained from the following sources:

- Integrated Risk Information System (IRIS) (U.S. EPA, 2000)
- Health Effects Assessment Summary Tables (HEAST) (U.S. EPA, 1995)

If toxicity criteria were not available from these sources, toxicity criteria presented in the Region 9 Risk-Based Concentration Tables (U.S. EPA, 1999b) were used. The toxicity criteria for the COPCs are presented in Appendix A (Tables 5-1 and 5-2 for noncarcinogenic effects and Tables 6-1 and 6-2 for carcinogenic effects). Chemicals of potential concern lacking toxicity criteria will be discussed in the Uncertainty Analysis.

9.5 RISK CHARACTERIZATION

In a risk characterization, the results of the exposure assessment and the toxicity assessment are integrated to quantitatively evaluate the potential current and future risk to human health. Carcinogenic and noncarcinogenic risks are evaluated for each COPC through each exposure route of concern and for all COPCs through all exposure routes combined. The risk characterization also identifies uncertainties associated with contaminant, toxicity, or exposure assumptions. Tables containing the risk calculations following the *Risk Assessment Guidance for Superfund*, Part D (U.S. EPA, 1998) format are provided in Appendix A.

9.5.1 Quantitative Evaluation for Chemical COPCs

Non-carcinogenic effects are evaluated by comparing estimated daily intakes of chemical COPCs to RfDs. This is accomplished by calculating hazard quotients (HQs) and hazard indices (HIs). An

HQ for a particular COPC through a given exposure route is the ratio between the estimated daily intake and the applicable RfD, as shown in the following equation:

$$HQ = EDI / RfD$$

where:

HQ = Hazard quotient (unitless)
EDI = Estimated daily intake (mg/kg-day)
RfD = Reference dose (mg/kg-day)

Screening level HIs were calculated by summing HQs across all exposure pathways and all target effects for all COPCs. Separate HIs were calculated for child and adult receptors. More appropriately, an HI is developed for chemicals that affect the same target organ or produce the same critical effect since the assumption of dose additivity is most properly applied to compounds that induce the same effect by the same mechanism of action (U.S. EPA, 1989). This approach is based on the assumption that combined exposure to several chemicals below their threshold level can result in an adverse health effect when they have the same critical effect or the same target organ. If the screening level HI exceeded one, chemical COPCs were segregated by target organ and a separate HI value for each effect/target organ was calculated. If the HQ for any chemical or if the HI value for any effect/target organ exceeds one, non-carcinogenic health effects are considered possible.

Carcinogenic risks were calculated for each carcinogen through each exposure pathway for each receptor. In risk assessment calculations, cancer risks are estimated as the incremental, or excess probability of an individual developing cancer over a lifetime as a result of exposure to a carcinogen. This risk is in addition to the lifetime cancer risk experienced by the general, non-exposed population. Cancer risks were calculated for each chemical COPC using the following formula:

$$Risk = EDI \times CSF$$

where:

Risk = Excess cancer risk (unitless probability)
EDI = Estimated daily intake (mg/kg-d) (see Section 3.3.2)

CSF = Cancer slope factor $(mg/kg\text{-}d)^{-1}$

The total risk posed by each chemical COPC will be calculated by adding risks posed by the COPC through all exposure routes. The lifetime incremental cancer risk posed by all chemical COPCs is estimated by summing the adult and child risks posed by all chemical COPCs through all exposure routes.

9.5.2 Residential Scenario

Under this current/future exposure scenario, it was assumed that residents use on-site groundwater as a potable water supply, potentially being exposed to chemical COPCs in groundwater through ingestion, dermal absorption while bathing, and inhalation of volatiles. Details of all risk calculations for this receptor group are presented in Appendix A.

Cancer Risk

The potential chemical cancer risk estimates associated with the residential scenario are presented in Table 9-2. The chemical cancer risk ranged from 4.6E-06 to 1.9E-05. Tetrachloroethene had an individual RME cancer risk estimate exceeding 1.0E-06 via ingestion, while trichloroethene, tetrachloroethene, and chloroform had individual RME cancer risk estimates greater than 1.0E-06 via inhalation.

Non-Cancer Health Effects

The estimates of the potential for adverse non-carcinogenic health effects associated with the residential scenario are presented in Table 9-3. The total HI (all COPCs, all target effects, all exposure routes) ranged from 1.4 to 1.4 for the adult resident and from 3.7 to 3.8 for the child resident. Chloroform was the only COPC with an individual HQ value (via inhalation) exceeding

one. Acetone, tetrachloroethene, and methylene chloride effect the same target organ (liver) as chloroform. These COPCs with the same target organ/effect had a total HI (based on effect) greater than one only when combined with chloroform.

9.5.3 Commercial / Industrial Worker Scenario

Under this exposure scenario, it is assumed that businesses are developed within the Evergreen Manor site. Commercial/industrial receptors were assumed to use on-site groundwater as a potable water supply, potentially being exposed to chemical COPCs in groundwater through ingestion, dermal absorption while bathing, and inhalation of volatiles. Details of all risk calculations for this receptor group are presented in Appendix A.

Cancer Risk

For this future groundwater pathway, the chemical cancer risk ranged from 2.0E-06 to 6.9E-06. Tetrachloroethene had an individual RME cancer risk estimate exceeding 1.0E-06 via ingestion and dermal absorption, while chloroform had an individual RME cancer risk estimate exceeding 1.0E-06 for inhalation.

Non-Cancer Health Effects

For the future groundwater pathway, the total HI ranged from 0.97 to 0.99. No COPCs with the same target organ/effect had a total HI (based on effect) greater than one in any of groundwater samples.

9.5.4 Uncertainty Analysis

The goal of an uncertainty analysis in a risk assessment is to provide to the appropriate decision makers (i.e., risk managers) a wide range of information about the key assumptions, their inherent uncertainty and variability, and the impact of this uncertainty and variability on the estimates of risk. The uncertainty analysis should show that risks are relative in nature and do not represent an absolute quantification. This is an important point that is vital to the proper interpretation and understanding of the risks presented in this report. This subsection attempts to explain the key assumptions used in this risk assessment and present a range of risks covering the variability inherent in these assumptions.

There are three areas in this report with significant levels of uncertainty, which are described in the following subsections:

- Environmental data used in risk assessment.
- Exposure assumptions.
- Toxicological assumptions.

Environmental Data Used in Risk Assessment

The environmental data collected from a site and how it is used in a risk assessment contributes uncertainty to the risk estimates. There is a measure of uncertainty associated with the exposure point concentrations used for the groundwater COPCs. The exposure point concentrations were set at the maximum detected concentration within the plume, and does not consider the possibility that some parts of the site might be more or less contaminated than others, and therefore the actual exposure point concentration might be different than the calculated values.

Exposure Assumptions

There are a number of exposure-related assumptions that are likely to result in significant uncertainty. In most cases, this uncertainty overestimates the realistic exposures, and therefore, overestimates the risk. This is appropriate when performing risk assessments of this type so that the risk managers can be reasonably assured that the risks to the public are not underestimated, and so that risk assessments for different locations and different scenarios can be compared.

Much of the uncertainty involves the use of standard exposure factors relating to a drinking water ingestion rate, frequency of exposure, etc. These factors are designed to cover reasonably maximum exposed individuals who are at the site for many years. It is very likely that an actual individual would be exposed to a lesser degree than the reasonable maximum, and possibly to a significantly lesser degree. Specific exposure assumptions that add uncertainty to the risk estimates are described below.

Toxicity Assessment

Toxicological uncertainties primarily relate to the methodologies by which carcinogenic and non-carcinogenic health criteria are developed. Standard slope factors and reference doses established by the U.S. EPA were used to estimate potential carcinogenic and non-carcinogenic health effects from exposure to chemical COPCs at the site. Cancer slope factors are derived using a non-threshold theory of cancer formation, which assumes there is no "safe" level of exposure to any carcinogen. The animal studies from which slope factors are usually derived are performed at high doses. The dose-response data from these studies is typically extrapolated down many orders of magnitude to estimate risks associated with the comparatively low dose to which humans might be exposed through environmental contamination. This low dose extrapolation produces conservative estimates of risk, possibly to a very significant degree. However, based on the current state of knowledge, this level of conservatism cannot be quantified.

There is also uncertainty associated with the estimation of non-cancer risks. In this case, there is an assumed threshold that can be tolerated by any individual without the threat of a potential health impact. The approach is to identify a sub-threshold level (i.e., the reference dose) that will be protective of the most sensitive individuals in the population. The reference dose is usually based on animal studies or limited human data and incorporates uncertainty factors anywhere from one to five orders of magnitude. These factors reflect the degree of extrapolation used in the derivation of a reference dose (U.S. EPA, 1989).

The application of a route-specific slope factor and reference dose to another exposure route contributes uncertainty to the evaluation of risks. Most reference doses and some slope factors are expressed as the amount of a substance administered, while dermal exposure estimates are expressed as an absorbed dose. Ideally, each oral toxicity value should be adjusted by an appropriate gastrointestinal absorption factor (U.S. EPA, 1989). The lower the gastrointestinal absorption factor, the more conservative the derived toxicity values. There is limited information on the absorption of the COPCs; thus, no adjustments were made to the oral toxicity values. Assuming 100% gastrointestinal absorption may lead to a non-conservative estimate of a dermal toxicity value. However, the use of adequately conservative uncertainty factors in the derivation of toxicity values is expected to ensure that the health criteria used are adequately protective of human health.

Summary

Table 9-4 presents a qualitative evaluation of the effects of each of these three key areas of uncertainty on the estimation of risk for the Evergreen Manor site. The risks presented in this report need to be viewed in light of the inherent uncertainty, which is summarized in this table. Column 1 lists the uncertainty elements identified as key contributors to this risk assessment. Column 2 shows the assumptions that represent a likely moderate to high overestimation of risk, while

potential underestimations of risk are noted in Column 3. Column 4 identified several areas where the potential exists for low to moderate over- or underestimation of risk.

In summary, the level of uncertainty in this risk assessment is moderate. Most of the uncertainty results in overestimating risk, while some may result in either an over- or an underestimation of the risk, and some may result in an underestimation of risk. However, it is likely that the overall risk is overestimated by an order of magnitude.

Table 9-1

Permeability Coefficients for Organic COPCs
Evergreen Manor Site
Roscoe, Winnebago County, Illinois

Chemical of Potential Concern	Permeability Coefficient (cm/hr)
Acetone	5.7E-04
Benzene	2.1E-02
Methylene chloride	4.5E-03
Tetrachloroethene	4.8E-02
Trichloroethene	1.6E-02
Chloroform	8.9E-03

Table 9-2

Total Carcinogenic Risk Associated with Chemical COPC Exposure
Evergreen Manor Site
Roscoe, Winnebago County, Illinois

Exposure Route	Total Lifetime Cancer Risk			
	Residential Land Use (Child+Adult)		Commercial/Industrial Land Use (adult)	
	RME	CT	RME	CT
Ingestion	8.6E-06	1.8E-06	2.0E-06	5.1E-07
Dermal absorption	2.2E-06	1.7E-07	1.1E-06	1.0E-07
Inhalation	8.5E-06	2.6E-06	3.8E-06	1.4E-06
Subtotal	1.9E-05	4.6E-06	6.9E-06	2.0E-06

Table 9-3

Total Hazard Index Associated with Chemical COPC Exposure
Evergreen Manor Site
Roscoe, Winnebago County, Illinois

Exposure Route	Total Hazard Index					
	Residential Land Use (Child)		Residential Land Use (Adult)		Commercial/Industrial Land Use (Adult)	
	RME	CT	RME	CT	RME	CT
Ingestion	2.0E-01	1.4E-01	8.8E-02	6.1E-02	3.1E-02	2.2E-02
Dermal absorption	2.1E-02	5.2E-03	1.2E-02	3.0E-03	8.5E-03	2.2E-03
Inhalation	3.6	3.6	1.3	1.3	9.5E-01	9.5E-01
Subtotal	3.8	3.7	1.4	1.4	9.9E-01	9.7E-01

Table 9-4

Summary of Uncertainty Analysis
Evergreen Manor Site
Roscoe, Winnebago County, Illinois

Uncertainty Element	Effect on Risk Estimates		
	Potential for Overestimation	Potential for Underestimation	Potential for Over- or Underestimation
Environmental Data			
Insufficient data to characterize media being evaluated			Low
Systematic or random errors in the chemical analyses yielding erroneous data			Low
Elimination of chemicals from quantitative analysis based on background levels and risk-based screening		Low	
Use of current exposure concentrations to represent future conditions (i.e., assumption of no attenuation of site chemicals)	Moderate		
Exposure Parameter Estimation			
Standard assumptions regarding body weights, [illegible] expectancy			Low
Media intake rates	Moderate		
Dermal absorption factors	Moderate		
Toxicity Data			
Use of U.S. EPA RfDs/SFs	Moderate-High		
Use of oral toxicity criteria for dermal exposure		Low	

SECTION 10

ECOLOGICAL RISK ASSESSMENT

A preliminary or screening-level risk evaluation is the initial ecological risk assessment screening at a hazardous waste site (U.S. EPA, 1996d). A screening level risk evaluation was conducted at the Evergreen Manor site to evaluate the potential impacts of contaminants on ecological receptors inhabiting the site and adjacent areas. U.S. EPA (1997b) defines a screening-level ecological risk assessment as "a preliminary risk assessment that can be conducted with limited site-specific data by defining assumptions for parameters that lack site-specific data." To ensure that sites which may pose an ecological risk are properly identified, U.S. EPA (1997b) suggests that "values should be consistently biased in the direction of overestimating risk. Without this bias, a screening evaluation could not provide a defensible conclusion for an absence of ecological risk." In conjunction with the human health risk assessment, the ecological risk assessment forms the basis for determining the need for remedial activities at a site and serves as the justification for the selected remedial action.

Technical risk assessment guidance for the performance of the screening-level ecological risk assessment came primarily from:

- *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments* (U.S. EPA, 1997b).
- *Guidelines for Ecological Risk Assessment* (U.S. EPA, 1998b).

This screening-level ecological risk assessment consists of the following two steps:

- Screening-Level Problem Formulation and Screening-Level Ecological Effects Evaluation
- Screening-Level Preliminary Exposure Estimate and Risk Calculation

Each step of the screening-level ecological risk assessment for the Evergreen Manor site is presented in the following sections.

10.1 SCREENING-LEVEL PROBLEM FORMULATION

The screening-level problem formulation step focuses on identifying categories of potential ecological receptors that may exist in the site area; identifying contaminants which may pose unacceptable risk to those receptors; and determining contaminant fate/transport and toxicity mechanisms (U.S. EPA, 1996d). It is a planning step that identifies the major factors (i.e., environmental setting, extent of contamination, contaminant fate and transport, potential receptors, and complete exposure pathways) to be considered in the screening-level ecological risk assessment. The problem formulation is "the formal process of generating and evaluating preliminary hypotheses about why ecological effects have occurred or may occur from human activities" (U.S. EPA, 1998b). It is a planning step that identifies the major factors (e.g., site ecology, extent of contamination, potential ecological receptors) to be considered in the assessment. The problem formulation addresses the following issues that are discussed in this section:

- Environmental setting and contamination.
- Contaminant fate and transport.
- Toxic mechanisms and potential receptors.
- Complete exposure pathways.
- General assessment endpoints.
- Conceptual model.

10.1.1 Environmental Setting

10.1.1.1 Site Description

A description of the physical features of the Evergreen Manor site and the history of its use and past removal activities are provided in Section 2 of this document. Further information on the physical

setting of the site and surrounding area including climate, vegetation, soil type, surface hydrology, and groundwater hydrology is presented in the *RI/FS Work Plan* (WESTON, 2000b) and the *Quality Assurance Project Plan* (WESTON, 2000a) and in Section 3 of this document.

10.1.1.2 Site Ecology

The site is located in the Central Lowland geomorphic province, in the eastern broadleaf forest province of the Hot Continental Division in the Humid Temperate Domain (USDA Forest Service, Ecological Subregions of the United States, http://www.fs.fed.us/land/pubs/ecoregions).

The Rock River receives drainage from three major streams - the Pecatonica River, the Kishwaukee River, and the Green River. It is 163 miles long in Illinois, and drains 2,272,000 acres in Illinois. Of the total river miles in this basin, 69 stream miles have "good" overall resource quality and 97.9 miles have "fair" quality. The Rock River enters the Mississippi River at Rock Island (IDNR, http://dnr.state.il.us/lands/education/valerie/end/page6.htm). At Rockton, the mean daily discharge ranges from 2830 cfs in September to 7375 cfs in April, with an annual mean of 4178 cfs (USGS CD-ROM, Current Year Discharge, http://www.il.water.usgs.gov/cd04-99/dis_tbl/05437500.htm). Dry Creek, a tributary of the Rock River, enters the river northwest of the Tresemer Subdivision. West of Dry Creek, the river is classified by the NWI as a riverine wetland and east of the creek, the river is classified as a lacustrine system. Forested wetlands border both the river and the creek west of the site and the river south of the site. There are small areas of emergent wetlands within the Evergreen Manor subdivision (Figure 10-1).

The U.S. Fish and Wildlife Service (USFWS) was contacted to obtain information on threatened and endangered species within the Evergreen Manor project area. Species that may be present in the area include the endangered Indiana bat (*Myotis sodalis*), the threatened prairie bush clover (*Lespedeza leptostachya*), the threatened bald eagle (*Haliaeetus leucocephalus*). Further information on these species and their critical habitat is provided in Appendix A.

10.1.2 Extent of Contamination

Information on the extent of contamination at the Evergreen Manor site is summarized in Section 7 of this document. Information on field sampling methods are presented in the *Quality Assurance Project Plan* (WESTON, 2000a), the *RI/FS Work Plan* (WESTON, 2000b), and Section 4 of this document. All data used in this evaluation were obtained during the RI. Elevated levels of VOCs were measured in groundwater. VOCs were not detected in surface water, and downgradient of the site, only one VOC was detected at a low concentration in sediment.

10.1.3 Contaminant Fate and Transport

While ecological receptors are generally not exposed to groundwater; the Rock River and Dry Creek are adjacent to this site, and migration of groundwater contaminants to surface water is a potential concern at this site; thus, this medium will be evaluated in the ecological risk assessment. Information obtained during the site investigation indicated that contamination is restricted to the unconfined sand and gravel outwash aquifer. The water table is approximately 35 feet bgs in this aquifer.

10.1.4 Potential Ecological Receptors

Ecological receptors potentially exposed to groundwater contaminants from the Evergreen Manor site include animals and plants common to rivers and streams of northwestern Illinois. A quantitative survey of wildlife was not performed at this site as part of the screening-level ecological risk assessment, though wildlife observations were made during RI activities. Aquatic biota potentially inhabiting the Rock River and Dry Creek are the primary receptors at this site.

10.1.5 Complete Exposure Pathways

For an exposure pathway to be complete, a contaminant must be able to travel from the source to ecological receptors and to be taken up by the receptors via one or more exposure routes (U.S. EPA, 1998b). For aquatic organisms, direct contact with water through the gills or dermis and ingestion of water, food, and sediments are the primary exposure routes.

10.1.6 General Assessment Endpoints

Assessment endpoints are "explicit expressions of the environmental value that is to be protected" (U.S. EPA, 1998b). The ecological resources selected to represent management goals for environmental protection are reflected in the assessment endpoint. Assessment endpoints link the risk assessment to management concerns and they are central to conceptual model development (U.S. EPA, 1998b). The following principal criteria are used when selecting assessment endpoints (U.S. EPA, 1998b):

- The contaminants present and their concentrations.
- Mechanisms of toxicity of the contaminants to different groups of organisms.
- Ecologically relevant receptor groups that are potentially sensitive or highly exposed to the contaminant and attributes of their natural history.
- Potentially complete exposure pathways.

The preliminary assessment endpoints for the Evergreen Manor site are changes in the aquatic community structure and function attributable to COPCs measured in groundwater discharging to surface water in the Rock River and Dry Creek.

10.1.7 Conceptual Model

The conceptual model establishes the complete exposure pathways that are evaluated in the ecological risk assessment and the relationship of the measurement endpoints to the assessment endpoints (U.S. EPA, 1997b). The conceptual model for the Evergreen Manor site is presented in Table 10-1. Based on the conceptual site model, the exposure scenario included in the environmental evaluation of the site was an aquatic community hazard quotient evaluation for fish and other aquatic organisms that are directly exposed to COPCs in groundwater that discharges to surface water, where media concentrations are compared with surface water quality benchmarks.

10.2 SCREENING-LEVEL ECOLOGICAL EFFECTS EVALUATION

In the ecological effects evaluation, information on the toxicity of the COPCs to ecological receptors is presented. Toxicity information was used to develop toxicity reference values (TRVs) for selected indicator species or communities. TRVs are expressed as an acceptable daily dose or media concentration, depending on the receptor(s).

10.2.1 Constituents of Potential Concern

For groundwater, all VOCs detected above method detection limits are considered to be COPCs.

10.2.2 Toxicity Reference Values

For each COPC with a potentially complete exposure pathway, a screening-level toxicity reference value (TRV) was developed from a review of literature. TRVs based on media concentrations are not specific to individual species but instead are applicable to groups of organisms or communities occupying the same medium (e.g., aquatic biota in surface water). The potential exists for ecological receptors to indirectly contact groundwater through existing or potential discharge to sediments and

surface water. Surface water TRVs are used to conservatively evaluate this potential exposure pathway, assuming no attenuation or dilution of contaminants.

As a means of characterizing aquatic toxicity, national ambient water quality criteria (NAWQC) have been developed for the protection of 95 percent of all aquatic life where sufficient data are available (U.S. EPA, 1992e). Ambient water quality criteria are designed to be protective of all aquatic biota occupying the same aquatic community or body of water. Not only fish, but also aquatic invertebrates and plants are protected (U.S. EPA, 1986). However, NAWQC are not available for the COPCs (U.S. EPA, 1999c). In addition, no state general use water quality standards are available for the COPCs (35 IAC Part 302). Since water quality standards are not available for the COPCs, alternative screening values are proposed. Tier II values described in the *Proposed Water Quality Guidance for the Great Lakes System* (U.S. EPA, 1993, as presented in Suter and Tsao, 1996) and the lowest chronic value (LCVs) presented in the literature for a chemical (Suter and Tsao, 1996) are proposed as surface water screening benchmarks.

10.3 SCREENING LEVEL EXPOSURE ESTIMATE

The screening-level exposure estimation involves the selection of exposure parameters for use in calculating a daily exposure dose or exposure concentration. Measured environmental medium concentrations (e.g., surface water, groundwater, sediment, and soil) are used for estimating exposure of terrestrial and aquatic wildlife to site contaminants. Chemical exposure by aquatic life such as fish are evaluated in this assessment through direct comparison to ecological benchmarks rather than dose calculations. To estimate chemical exposure by aquatic life, groundwater concentrations are compared directly to toxicity benchmarks (e.g., surface water screening benchmarks).

10.4 SCREENING-LEVEL RISK CHARACTERIZATION

The screening-level risk characterization integrates information from the screening-level problem formulation, screening-level ecological effects evaluation, and the screening-level exposure estimate to predict the nature and extent of ecological risk or threat, as well as the environmental impact of previous site activities.

A comparison of groundwater chemical concentrations with freshwater surface water screening values was used to assess the likelihood of adverse effects to aquatic organisms inhabiting the Rock River and Dry Creek, which are downgradient of the Evergreen Manor site (Table 10-2). Comparison of groundwater chemical concentrations with surface water screening benchmarks were used to evaluate potential for adverse impacts to aquatic organisms from contaminants discharging to surface water. No screening benchmarks were exceeded; thus, negligible risk to aquatic receptors is expected at this site.

10.4.1 Summary of Uncertainty

The ecological risk assessment process is subject to a variety of uncertainties. Almost every step involves assumptions based on professional judgment. Due to the conservative nature of a screening-level ecological risk assessment, most of the uncertainty results are an overestimation of risk. However, the risk may also be underestimated or unknown. Uncertainties specific to this risk assessment can be attributed to:

- Environmental chemistry and sampling analysis.
- Fate and transport parameters.
- Exposure assumptions.
- Toxicological data.

Uncertainties specific to this risk assessment include the following:

- Maximum values were used as exposure point concentrations for all media. This is likely to result in an overestimation of risk, especially for aquatic ecological receptors who may inhabit a greater portion of a stream than the area represented by just one or a few samples

- Dilution and attenuation of VOCs in groundwater were not accounted for in estimating future surface water concentrations in the river and creek. These fate and transport processes are expected to occur, resulting in lower discharge concentrations.

- Tier II values were developed with fewer data than are required for the NAWQC. The Tier II values are concentrations that would be expected to be higher than NAWQC in no more than 20% of the cases (Suter and Tsao, 1996). Thus, this may result in an underestimation of risk.

- A surface water benchmark was not available for 1,1,2-trichloro-1,2,2-trifluoromethane. This VOC had the highest concentration of any of the VOCs measured in groundwater, which may result in an underestimation of risk.

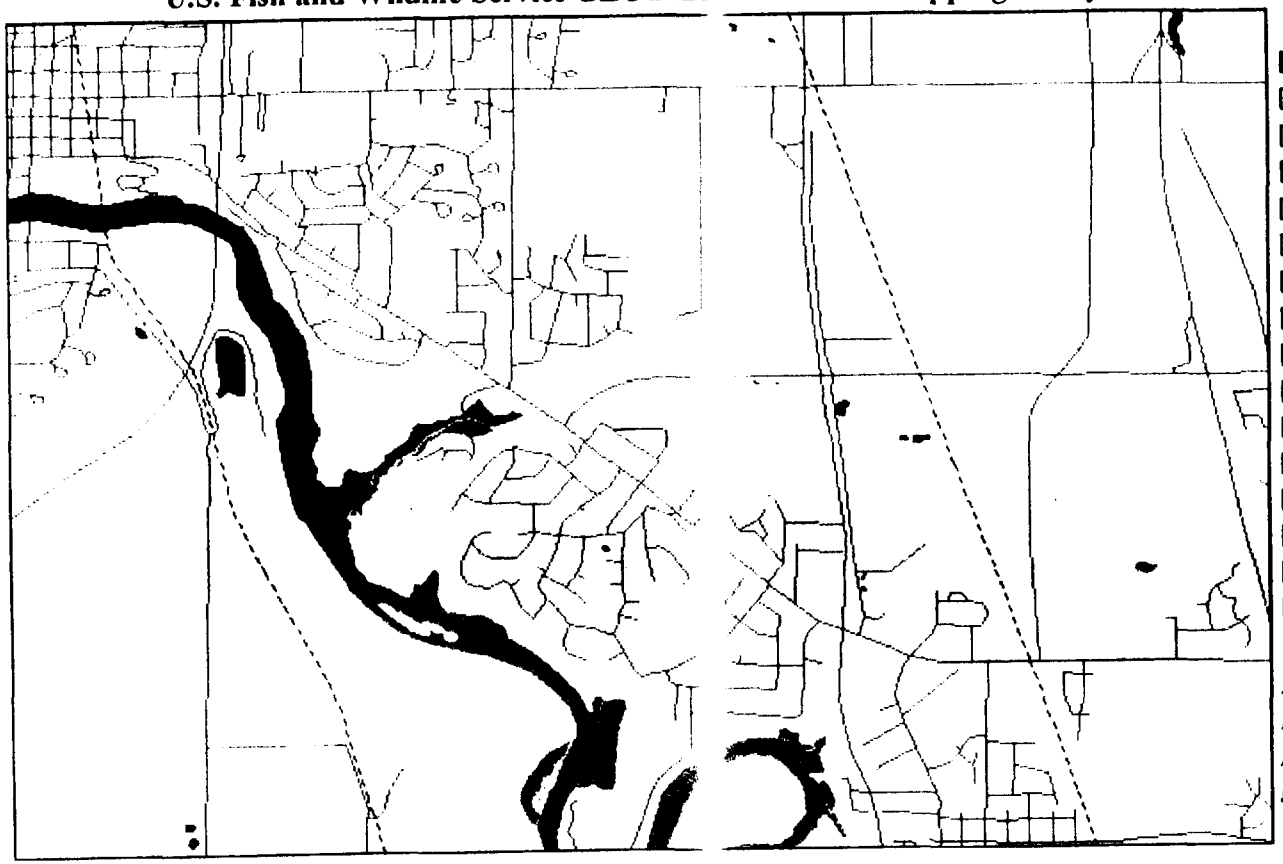
10.4.2 Risk Description

A screening-level ecological risk assessment was conducted at this site to evaluate which contaminants pose a potential adverse impact to ecological receptors inhabiting the Evergreen Manor site and the adjacent Rock River and Dry Creek. Direct impacts on fish were evaluated for VOCs discharging from groundwater to surface water. Actual measured concentrations in surface water did not exceed detection limits, and the constituents detected in sediment were from upgradient samples, or do not have available toxicological data. Thus, surface water and sediment pathways were not evaluated.

To ensure that sites which may pose an ecological risk are properly identified, U.S. EPA (1996d) suggests that values used in a screening level assessment should be consistently biased in the direction of overestimating risk." Without this bias, a screening evaluation could not provide a defensible conclusion for an absence of ecological risk."

The screening-level ecological risk assessment found that there is a negligible potential for adverse effects on aquatic organisms in the Rock River and Dry Creek from site-related chemical contamination.

U.S. Fish and Wildlife Service GEOTRA :T Internet Mapping Utility



- L1UBHH
- PEMA
- PEMAH
- PEMC
- PEMCH
- PFO1A
- PFO1AH
- PFO1C
- PFO1CH
- POWHX
- PSS1C
- PUBFX
- PUBGX
- R2UBH
- Upland
- No Data Available
- Streams
- Roads
- Railroad
- Counties
- States

1 0 1 2
km

U.S. FISH & WILDLIFE SERVICE

FIGURE 10-1

WESTON MANAGERS DESIGNERS/CONSULTANTS

750 E. Bunker Ct.
Suite 500
Vernon Hills, Illinois
60061

WETLANDS NEAR EVERGREEN MANOR SITE

EVERGREEN MANOR SITE

Roscoe, Illinois

Table 10-1

Preliminary E ·ological Conceptual Site Model
E\ ergreen Manor Site
Roscoe, \ Vinnebago County, Illinois

Exposure Medium	Exposure Route	Birds	Mammals	Fish	Macrobenthos
Groundwater (discharge to surface water)	Ingestion	O	O	X	O
	Dermal contact	O	O	X	O
	Inhalation	O	O	X	O
	Prey	O	O	X	O

X = Potential exposure route determined to be significant for this receptor.
O = Potential exposure route determined to be insignificant or cannot be evalua d for this receptor.

Table 10-2

Comparison of Groundwate Concentrations to Surface Water Screening Values
Evergreen Manor Site
Rosc , Winnebago County, Illinois
A l concentrations in ug/L

Chemical	Frequency of Detection	Range of Detec ons		Maximum Location	Tier II Value		Lowest Chronic Value
		Minimum	Max um		Secondary acute	Secondary chronic	chronic
Residential wells							
cis-1,2-Dichloroethene	1/20	--	2 0	RW-04	1100	590.00	9538*
Trichloroethene	3/20	0.7	6 0	RW-04	440	47.00	7257*
Tetrachloroethene	2/20	0.9	2 0	RW-04	830	98.00	750
Acetone	2/20	0.6	0 0	RW-03	28000	1500.00	507640*
1,1,1-Trichloroethane	6/20	0.6	5 0	RW-07	200	11.00	3493*
Chloroform	1/20	--	0 0	RW-08	490	28.00	1240
Toluene	9/20	1	2 0	RW-13;14;15;17;18;22	120	9.80	1269*
CPT wells							
Acetone	31/73	1	100 00	CPT-05-06	28000	1500.00	507640*
1,1-Dichloroethane	1/73	--	2 0	CPT11-05		47.00	
cis-1,2-Dichloroethene	5/73	1	2 0	CPT-01-02	1100	590.00	9538*
Trichloroethene	8/73	2	4 0	CPT-01-03;01-04;01-06	440	47.00	7257*
Toluene	60/73	0.5	3 0	CPT-11-08	120	9.80	1269*
Methylene chloride	1/73	--	0 0	CPT-03-05	26000	2200.00	42667
Benzene	3/73	0.5	0 0	CPT-09-07	2300	130.00	525000
2-Butanone	11/73	--	16 00	CPT-05-06	240000	14000.00	282170*
m-&/or p-Xylene	3/73	0.5	0 0	CPT-06-01;09-07	32	1.80	62308* a
Xylenes (total)	2/73	0.6	0 0	CPT11-01;20-01	32	1.80	62308* a
Ethylbenzene	1/73	--	0 0	CPT-09-07	130	7.30	>440
Tetrachloroethene	2/73	0.6	0 0	CPT-10-02	830	98.00	750
1,1,1-Trichloroethane	17/73	0.8	3 0	CPT-11-06	200	11.00	3493*
Monitoring wells							
Acetone	1/15	--	35 00	MW103D	28000	1500.00	507640*
cis-1,2-Dichloroethene	2/15	1	2 0	MW105D	1100	590.00	9538*
Trichloroethene	3/15	2	3 0	MW105D	440	47.00	7257*
Tetrachloroethene	1/15	1	9 0	MW103S	830	98.00	750
1,1,2-Trichloro-1,2,2-trifluoromethane	2/15	1	300 00	MW103D	NA	NA	NA
1,1,1,-Trichloroethene	6/15	1	3 0	MW103D;105D	200	11.00	3493*

Notes:
Only chemicals measured above detection limits are presented.
No Illinois general use water quality standards or national ambient wate uality criteria available for the COPCs.
Tier II and lowest chronic values from Suter and Tsao, 1996.
NA = No available.
* = Estimated value (Suter and Tsao, 1996).
a = Value is for total xylenes (Suter and Tsao, 1996).

SECTION 11

CONCLUSIONS AND RECOMMENDATIONS

This section presents conclusions and recommendations for actions at the Evergreen Manor site, based on the results of this remedial investigation. The conclusions subsection summarizes the major findings of this report, and the recommendations subsection presents recommendations for future action.

11.1 CONCLUSIONS

The following subsections summarize the major findings of this report with regard to site geology and hydrogeology, nature and extent of contamination, contaminant fate and transport, and the assessment of risks presented by the contaminated media.

11.1.1 Site Geology and Hydrogeology

The geology of the site is characterized by fill, topsoil, and/or organic deposits overlying thick glaciofluvial outwash deposits of sand and gravel. These deposits in-filled the former Rock River Valley during and following the most recent glacial events. Although none of the CPT investigations reached bedrock, previous studies (Berg, et.al., 1981; Wehrmann, 1984) indicated that overburden deposits in the vicinity of the Evergreen Manor site are approximately 250 feet thick and overlie the bedrock surface. The hydraulic conductivity of this unconfined aquifer has been estimated by others to be 3.8×10^{-2} cm/sec (Wehrmann, 1984).

Based on measurements collected during the RI, the depth to groundwater was found to vary between approximately 30 to 39 feet below grade. Table 6-1 indicates that depth to water in well cluster MW101 is about 3 ft bgs, however, this well cluster is located in the Roscoe Sand and Rock

quarry, approximately 30 ft lower in elevation than McCurry Road. Similarly, well cluster 110 is located in a depression along Illinois Route 251.

When measured in well clusters, groundwater elevations were found to be nearly identical. This indicates the shallow and deeper aquifer zones are in direct hydraulic connection and that there are no zones of fine material (i.e., silt or clay) that would create semi-confining zones. Based on stratigraphy data from the CPT investigation, the aquifer is believed to be unconfined, and is most likely continuous down to bedrock. The horizontal hydraulic gradient, based on groundwater elevations shown on Figure 6-5, is approximately 0.0015 ft/ft. Using this gradient, the hydraulic conductivity of 3.8×10^{-2} cm/sec, and an estimated porosity of 30% (Fetter, 1994), the average linear flow velocity was calculated to be 1.9×10^{-4} cm/sec (0.54 ft/day).

11.1.2 Nature and Extent of Contamination

Screening levels were developed for illustrating the nature and extent of contamination at this site and to identify COCs in environmental media at the site. The constituents detected in each medium were compared to the screening levels. Concentrations of constituents exceeding the screening levels were considered to be COCs. Screening levels are not directly implemented as RAOs; these may be developed, as appropriate, in the future FS/RA process. The following paragraphs identify the COCs found, and the nature and extent of contamination.

Groundwater

A total or 13 VOCs, as shown on Tables 7-2 through 7-4, were detected in samples collected from CPT, monitoring wells, and residential wells. Only three of these constituents exceeded screening levels. Trichloroethene was detected in residential well RW04 (11990 Blue Spruce Dr.), at a concentration of 6 ppb, which exceeded the screening level of 5 ppb. Chloroform was detected in

residential well RW08 (11943 Wagon Ln.), at a concentration of 0.9 ppb, which exceeded the screening level of 0.02 ppb. Tetrachloroethene was detected in monitoring well MW103S at a concentration of 9 ppb, which exceeded the screening level of 5 ppb. The levels of chlorinated VOCs detected during this RI are significantly lower than those previously determined, indicating continued diminishing contamination of the aquifer.

Based on these detections, chloroform, tetrachloroethene, and trichloroethene are considered COCs. The extent of positive detections is shown on Figure 7-1, however, the extent of contamination should only be considered as the area in the immediate vicinity of the three locations where COCs were identified.

Sediments

A total of four VOCs, as shown in Table 7-5, were detected in the collected sediment samples from Dry Creek and the Rock River. The detected concentrations of the constituents were orders of magnitude less than their respective screening levels. Therefore, there are no COCs in the sediment medium.

Surface Water

As shown on Table 5-8, the results of the surface water analyses were all below the method detection limits. Therefore, there are no COCs in the surface water medium.

Sources

Previous investigations have not been able to pinpoint an exact source of contamination for the Evergreen Manor site, but have identified the industrial area near the intersection of Rockton Road

and Illinois Route 251 as the likely source area of contamination. The same general conclusion is drawn from the results of this RI. This conclusion is based on the results of the groundwater analytical data from this RI and the fracture trace analysis results. Concentrations detected were not able to lead to the identification of an exact source, but the fracture trace analysis indicated that the industrial area near Rockton Road and Illinois Route 251 is a potential source area.

11.1.3 Contaminant Fate and Transport

It is possible for COCs identified at the site to migrate from one medium to another. COCs at the site were only found in groundwater. Through groundwater movement these COCs migrate downgradient by advection and discharge into the Rock River. The concentrations of COCs will decrease during transport due mostly to dispersion, and possibly to biodegradation. Thus, when the COCs enter the Rock River, and are diluted, concentrations of COCs are below analytical detection limits. Although undetectable in surface water, the groundwater to surface water pathway is considered a pathway of concern. Other pathways, such as the groundwater to air pathway, are not considered to pose a threat.

The BIOSCREEN model was used to estimate when COC concentrations will decline below screening levels. The model results predict that chloroform will be below its screening level about three years after the RI, in about 2003. TCE is predicted to be below its screening level about six years after the RI, in about 2006. PCE is predicted to be below its screening level about 15 years after the RI, in about 2015.

11.1.4 Risk Assessment

Baseline human health and ecological risk assessments were performed to evaluate the potential human health and environmental impacts associated with the site if no removal actions were undertaken. The following subsections summarize the results of each risk assessment.

11.1.4.1 Baseline Human Health Risk Assessment

The baseline human health risk assessment evaluated residential users, and commercial/industrial workers as the primary receptors at the site. The maximum detected concentration was used as the exposure point concentration combining data from the residential wells, monitoring wells, and CPT since no identifiable plume was found. Potential exposure to site groundwater was estimated individually for adult and child residents and adult commercial/industrial workers. An exposure scenario with a calculated cancer risk value exceeding 1E-06, and/or a non-cancer hazard index exceeding 1.0, is considered to have risk.

The residential groundwater exposure scenario carcinogenic risk estimates ranged from 4.6E-06 to 1.9E-05. The constituents that primarily drove the carcinogenic risk numbers in these scenarios include chloroform, tetrachloroethene, and trichloroethene. The residential groundwater exposure scenario total hazard index ranged from 1.4 to 1.4 for an adult and from 3.7 to 3.8 for a child. The risk was primarily driven by chloroform across the inhalation pathway for both children and adults. To a lesser extent, trichloroethene contributed to the inhalation pathway risk value as well.

The commercial/industrial land use exposure scenario carcinogenic risk estimates ranged from 2.0E-06 to 6.9E-06. The risk was primarily driven by tetrachloroethene, trichloroethene, and chloroform. The commercial/industrial land use exposure scenario total hazard index ranged from 0.97 to 0.99, which does not exceed the non-cancer threshold of unity.

11.1.4.2 Ecological Risk Assessment

The ecological risk assessment focused on the potential direct impact of VOCs to fish living in Dry Creek and the Rock River. The screening-level ecological risk assessment found that there is negligible potential for adverse effect on aquatic organisms in the Rock River and Dry Creek from site-related chemical constituents.

11.1.5 Contaminant Concentrations

Based on a comparison of data presented in this RI and the data used to support the Hazard Ranking Score, it appears that the concentrations of chlorinated VOCs are decreasing. There has been an approximate order of magnitude decline in concentrations.

11.1.6 Non-Time Critical Removal Action

Because concentrations of VOCs were still detected above screening levels, an appropriate remedy is warranted under current guidance and protocol. However, the U.S. EPA completed a non-time critical removal action at the Evergreen Manor site in September 2000. This included the installation of an extension to the existing public water system to include residences located in the subdivisions impacted by VOCs, and the abandonment of private residential water wells. This removal action is discussed in greater detail in the EE/CA, and the Action Memorandum requesting its implementation.

The result of this removal action is that it has effectively deleted the residential well exposure pathway that was discussed in the human health risk assessment. Thus, since the exposure pathway has been eliminated, the associated human health risk has also been eliminated.

11.2 RECOMMENDATIONS

Based on the conclusions put forth above, there does not appear to be significant risk associated with the Evergreen Manor site at this time. The following recommendations are intended to make sure that no new risks could develop as a result of changing site conditions or new developments.

- Although risk to residents in the Evergreen Manor site subdivisions has been addressed, not all of the residences were included in the public water system expansion. Residential wells still used to provide water from the shallow aquifer to residences on either side of the expanded water system should be sampled for VOCs at least every five years. This will ensure that the removal action has met its goals and will protect residents close to the contamination.

- Based on a historical decline of concentrations across the site, as evidenced by laboratory data, and as simulated through modeling, it is expected that constituent concentrations will continue to decline, and ultimately decline below screening levels. The IEPA-installed monitoring wells should be sampled periodically in order to ensure that constituent concentrations are indeed declining, and that ultimately no more contamination travels to the remaining residential wells.

- Measures should be taken to ensure that no new drinking water wells are installed in or near the Evergreen Manor site contamination. This could be accomplished through local ordinance or deed restrictions and should cover those areas not currently used for residential purposes.

- As a result of the RI work performed, no further attempts at source identification are recommended. Thus, soil and sediment sampling is not warranted, and no new monitoring wells are recommended at this time.

- As required by the U.S. EPA, a Five Year Review of the Evergreen Manor site should be completed. This review should evaluate any groundwater data collected since this RI, and evaluate the effectiveness, with respect to areal coverage, of the public water supply in the Evergreen Manor site subdivisions and other areas coincident with the plume.

SECTION 12

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APPENDIX A

SUPPORTING MATERIAL FOR HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS

RFW036-30-AFZT

United States Department of the Interior

IN REPLY REFER TO:

FWS/RIFO

FISH AND WILDLIFE SERVICE
Ecological Services
Rock Island Field Office
4469 48th Avenue Court
Rock Island, Illinois 61201
Tel: 309/793-5800 Fax: 309/793-5804

RECEIVED
JUL 18 2000

July 10, 2000

cc: K. Fischer
T. Bosko

Mr. Terry Bosko
Technical Manager
Roy F. Weston, Inc.
750 E. Bunker Ct. Ste 500
Vernon Hills, IL 60061-1450

Dear Mr. Bosko:

This is in response to your letter to our Rock Island Field Office dated June 27, 2000, requesting threatened and endangered species information relative to your Evergreen Manor project area. Our comments are provided below.

We have reviewed the information provided for the location of this site. To facilitate compliance with Section 7(c) of the Endangered Species Act of 1973, as amended, Federal agencies are required to obtain from the Fish and Wildlife Service information concerning any species, listed or proposed to be listed, which may be present in the area of a proposed action. Therefore, we are furnishing you the following list of species which may be present in the concerned area:

Classification	Common Name (Scientific Name)	Habitat
Endangered	Indiana bat (*Myotis sodalis*)	Caves, mines; small stream corridors with well developed riparian woods; upland forests
Threatened	Prairie bush clover (*Lespedeza leptostachya*)	Dry to mesic prairies with gravelly soil
Threatened	Bald Eagle	Wintering, breeding

The endangered Indiana bat (*Myotis sodalis*) could potentially occur throughout the state of Illinois. During the summer, the Indiana bat frequents the corridors of small streams with well developed riparian woods as well as mature upland forests. It forages for insects by flying beneath the tree canopy, and roosts and rears its young beneath the loose bark of large dead or dying trees. It winters in caves and abandoned mines.

Suitable summer habitat in Iowa is considered to have the following characteristics within a ½ mile radius of the project site:

1) forest cover of 15% or greater;
2) permanent water;
3) one or more of the following tree species 9 inches diameter at breast height (dbh) or greater: shagbark hickory, bitternut hickory, American elm, slippery elm, eastern cottonwood, silver maple, white oak, red oak, post oak, and shingle oak;
4) at least 1 potential roost tree per 2.5 acres;
5) potential roost trees must have greater than 10% coverage of loose bark (by visual estimation of peeling bark on trunks and main limbs).

If the project site contains any habitat that fits the above description, it may be necessary to conduct a survey to determine whether the bat is present. If Indiana bats are known to be present, they must not be harmed, harassed, or disturbed and their habitat must not be destroyed. Indiana bat habitat may be altered only between the dates of October 1 and March 31.

The prairie bush clover (*Lespedeza leptostachya*) is listed as threatened in Winnebago County in Illinois. It occupies dry to mesic prairies with gravelly soil. There is no critical habitat designated for this species. Federal regulations prohibit any commercial activity involving this species or the destruction, malicious damage or removal of this species from Federal land or any other lands in knowing violation of State law or regulation, including State criminal trespass law. This species should be searched for whenever prairie remnants are encountered.

The threatened bald eagle (*Haliaeetus leucocephalus*) is listed as breeding and wintering in Winnebago County. During the winter, this species feeds on fish in the open water areas created by dam tailwaters, the warm water effluents of power plants and municipal and industrial discharges, or in power plant cooling ponds. The more severe the winter, the greater the ice coverage and the more concentrated the eagles become. They roost at night in groups in large trees adjacent to the river in areas that are protected from the harsh winter elements. They perch in large shoreline trees to rest or feed on fish. There is no critical habitat designated for this species. The eagle may not be harassed, harmed, or disturbed when present nor may nest trees be cleared.

These comments are provided under the authority of and in accordance with the provisions of the Fish and Wildlife Coordination Act (16 U.S.C. 661 et seq.; 48 Stat. 401), as amended; and the Endangered Species Act of 1973, as amended.

Thank you for the opportunity to provide comments early in the planning process. If you have any additional questions or concerns, please contact Kevin de la Bruere of my staff at extension 530.

Sincerely,

Richard C. Nelson
Supervisor

TABLE 1

SELECTION OF EXPOSURE PATHWAYS

EVERGREEN MANOR SITE, ROSCOE, WINNEBAGO COUNTY, ILLINOIS

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current	Residential well	Groundwater	Tap water	Resident	Adult	Ingestion	On-site	Quant	Private wells currently in use
						Dermal	On-site	Quant	Private wells currently in use
					Child	Ingestion	On-site	Quant	Private wells currently in use
						Dermal	On-site	Quant	Private wells currently in use
		Air	Water vapors at showerhead	Resident	Adult	Inhalation	On-site	Quant	Private wells currently in use
					Child	Inhalation	On-site	Quant	Private wells currently in use
Future	Monitoring well	Groundwater	Tap water	Resident	Adult	Ingestion	On-site	Quant	Private well may potentially be installed in the future
						Dermal	On-site	Quant	Private well may potentially be installed in the future
					Child	Ingestion	On-site	Quant	Private well may potentially be installed in the future
						Dermal	On-site	Quant	Private well may potentially be installed in the future
		Air	Water vapors at showerhead	Resident	Adult	Inhalation	On-site	Quant	Private well may potentially be installed in the future
					Child	Inhalation	On-site	Quant	Private well may potentially be installed in the future
Future	Monitoring well	Groundwater	Tap water	Commercial/Industria	Adult	Ingestion	On-site	Quant	Private well may potentially be installed in the future
						Dermal	On-site	Quant	Private well may potentially be installed in the future
		Air	Water vapors at showerhead	Commercial/Industria	Adult	Inhalation	On-site	Quant	Private well may potentially be installed in the future
Future	CPT well	Groundwater	Tap water	Resident	Adult	Ingestion	On-site	Quant	Private well may potentially be installed in the future
						Dermal	On-site	Quant	Private well may potentially be installed in the future
					Child	Ingestion	On-site	Quant	Private well may potentially be installed in the future
						Dermal	On-site	Quant	Private well may potentially be installed in the future
		Air	Water vapors at showerhead	Resident	Adult	Inhalation	On-site	Quant	Private well may potentially be installed in the future
					Child	Inhalation	On-site	Quant	Private well may potentially be installed in the future
Future	CPT well	Groundwater	Tap water	Commercial/Industria	Adult	Ingestion	On-site	Quant	Private well may potentially be installed in the future
						Dermal	On-site	Quant	Private well may potentially be installed in the future
		Air	Water vapors at showerhead	Commercial/Industria	Adult	Inhalation	On-site	Quant	Private well may potentially be installed in the future

TABLE 2.1

OCCURRENCE, DISTRIBUTIO: AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

EVERGREEN MANOR SITE

ROS( )E, WINNEBAGO COUNTY, ILLINOIS

Scenario Timeframe:	Current/Future
Medium:	Groundwater
Exposure Medium:	Groundwater
Exposure Point:	Tap water

CAS Number	Chemical	Minimum Concentration	Minimum Qualifier	Maximum Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (2)	Background Value	Screening Toxicity Valu	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (4) Contaminant Deletion or Selection
156-59-2	cis-1,2-Dichloroethene	1	J	2	J	ug/L	MW106S;106D;CPT-01-0	8/108	4	2	N/A	6.1	70	IEPA-TACO	N	BSL
75-34-3	1,1-Dichloroethane	--	--	2.0	J	ug/L	CPT11-05	1/108	1	2.0	N/A	70	700	IEPA-TACO	N	BSL
79-01-6	Trichloroethene	0.7	J	6	--	ug/L	RW-04	14/108	1	6	N/A	0.16	5	IEPA-TACO	Y	ASL
127-18-4	Tetrachloroethene	0.6	J	9	J	ug/L	MW103S	5/108	1	9	N/A	0.11	5	IEPA-TACO	Y	ASL
67-64-1	Acetone	0.6	--	100.0	J	ug/L	CPT-05-06	34/108	2	100.0	N/A	61	700	IEPA-TACO	N	ASL
71-55-6	1,1,1-Trichloroethane	0.6	J	5	J	ug/L	RW--07	29/108	2	5	N/A	79	200	IEPA-TACO	N	BSL
	1,1,2-Trichloro-1,2,2-trifluoromethane	2	J	300	J	ug/L	MW103D	2/108	2	300	N/A	N/A	N/A	IEPA-TACO	N	NTX
67-66-3	Chloroform	--	--	0.9	J	ug/L	RW-08	1/108	3	0.9	N/A	0.02	0.02	IEPA-TACO	Y	ASL
108-88-3	Toluene	1	J	3	--	ug/L	CPT-11-08	69/108	1	3	N/A	72	1000	IEPA-TACO	N	BSL
75-09-2	Methylene chloride	--	--	0.5	J	ug/L	CPT-03-05	1/108	1	0.5	N/A	0.43	5	IEPA-TACO	Y	ASL
71-43-2	Benzene	0.5	J	0.6	J	ug/L	CPT-09-07	3/108	1	0.6	N/A	0.04	5	IEPA-TACO	Y	ASL
78-93-3	2-Butanone	--	--	16.0	J	ug/L	C PT-05-06	1/108	11	16.0	N/A	190.00	N/A	N/A	N	BSL
1330-20-7	Xylenes (total)	0.6	J	0.6	J	ug/L	CPT11-01;02-01	2/108	1	0.6	N/A	140.00	10000	IEPA-TACO	N	BSL
1330-20-7	m-&/or p-Xylene	0.5	J	0.7	J	ug/L	CPT-06-01;02-07	3/108	1	0.7	N/A	140.00	10000	IEPA-TACO	N	BSL
100-41-4	Ethylbenzene	--	--	0.6	J	ug/L	CPT-09-07	1/108	1	0.6	N/A	130.00	700	IEPA-TACO	N	BSL

(1) Minimum/maximum detected concentration.

(2) Maximum detected concentration used as screening value.

(3) Background value not available for groundwater.

(4) IEPA-TACO (35 IAC 740). See Section 2 for supporting information.
For screening toxicity values: Cancer benchmark value = 1-07; HQ = 0.1.

(5) Rationale Codes Selection Reason: Infrequent Detection but Associated Historically (HIST)
Frequent Detection (FD)
Toxicity Information Available (TX)
Above Screening Levels (ASL)
Deletion Reason: Infrequent Detection (IFD)
Background Levels (BKG)
No Toxicity Information (NTX)
Essential Nutrient (NUT)
Below Screening Level (BSL)

Definitions: N/A = Not Applicable
SQL = Sample Quantitation Limit
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
UMTRCA = Uranium Mill Tailings Radiation Control Act soil protection standard (40 CFR 192).
MCL = Maximum contaminant level.
J = Estimated Value
C = Value has been changed from original data sheet
X = Gross value (no instrument background subtracted); actual net value will be approximately 1.2 pC

TABLE 3.1
MEDIUM-SPECIFIC EX 'OSURE POINT CONCENTRATION SUMMARY
EVERGREEN MANOR S TE, ROSCOE, WINNEBAGO COUNTY, ILLINOIS

Scenario Timeframe:	Current/Future
Medium:	Groundwater
Exposure Medium:	Groundwater
Exposure Point:	Tap water

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Ma imum Q alifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Trichloroethene	ug/L	--	--	6	J	ug/L	6	MAX	Undefined center of plume	6	MAX	Undefined center of plume
Tetrachloroethene	ug/L	--	--	9	J	ug/L	9	MAX	Undefined center of plume	9	MAX	Undefined center of plume
Chloroform	ug/L	--	--	0.9	J	ug/L	0.9	MAX	Undefined center of plume	0.9	MAX	Undefined center of plume
Acetone	ug/L	--	--	100	J	ug/L	100	MAX	Undefined center of plume	100	MAX	Undefined center of plume
Benzene				0.6	J	ug/L	0.6	MAX	Undefined center of plume	0.6	MAX	Undefined center of plume
Methylene chloride	ug/L	--	--	0.5	J	ug/L	0.5	MAX	Undefined center of plume	0.5	MAX	Undefined center of plume

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

TABLE 4.1a

VALUES USED FOR DAILY INTAKE CALCULATIONS

EVERGREEN MANOR SITE, ROSCOE, WINNEBAGO COUNTY, ILLINOIS

Scenario Timeframe:	Current/Future
Medium:	Groundwater
Exposure Medium:	Groundwater
Exposure Point:	Tap water
Receptor Population:	Resident
Receptor Age:	Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CW	Chemical concentration in water	mg/L	See Table 3	See Table 3	See Table 3	See Table 3	
	IR-W	Ingestion rate of water	L/day	2	EPA, 1999	1.4	EPA, 1997	CDI (mg/kg/d) = CW x IR x 1E-03 mg/ug x EF x ED / (BW x AT)
	EF	Exposure frequency	days/yr	350	EPA, 1999	350	EPA, 1991c	
	EDc	Exposure duration -carcinogens	yrs	24	EPA, 1999	7	EPA, 1997	
	EDnc	Exposure duration - noncarcinogens	yrs	30	EPA, 1999	9	EPA, 1997	
	BW	Body weight	kg	70	EPA, 1999	70	EPA, 1999	
	AT-C	Averaging time (cancer)	days	25550	EPA, 1999	25550	EPA, 1999	
	AT-NC	Averaging time (non-cancer)	days	8760	EPA, 1999	2555	EPA, 1999	
Dermal absorption	CW	Chemical concentration in water	mg/L	See Table 3	See Table 3	See Table 3	See Table 3	
	SA	Surface area available for contact	cm^2	23000	EPA, 1992a	20000	EPA, 1992a	CDI (mg/kg/d) = CW x SA x PC x 1L/1000 cm3 x ET x EF x ED x 1/BW x 1/AT
	PC	Permeability constant	cm/hr	chemical specific	EPA, 1992a	chemical specific	EPA, 1992a	
	ET	Exposure time	hr/day	0.75	EPA, 1997	0.33	EPA, 1997	
	EF	Exposure frequency	days/yr	350	EPA, 1991c	350	EPA, 1991c	
	EDc	Exposure duration -carcinogens	yrs	24	EPA, 1999	7	EPA, 1997	
	EDnc	Exposure duration - noncarcinogens	yrs	30	EPA, 1999	9	EPA, 1997	
	BW	Body weight	kg	70	EPA, 1999	70	EPA, 1999	
	AT-C	Averaging time (cancer)	days	25550	EPA, 1999	25550	EPA, 1999	
	AT-NC	Averaging time (non-cancer)	days	8760	EPA, 1999	2555	EPA, 1999	
Inhalation of vapors	CW	Chemical concentration in water	mg/L	See Table 3	See Table 3	See Table 3	See Table 3	
	IR-A	Inhalation rate of indoor air	m³/day	15	EPA, 1999	15	EPA, 1999	CDI (mg/kg-d) = CW x IR-A x EF x ED x K x 1/BW x 1/AT
	EF	Exposure frequency	days/yr	350	EPA, 1999	350	EPA, 1999	
	EDc	Exposure duration -carcinogens	yrs	24	EPA, 1999	7	EPA, 1997	
	EDnc	Exposure duration - noncarcinogens	yrs	30	EPA, 1999	9	EPA, 1997	
	BW	Body weight	kg	70	EPA, 1999	70	EPA, 1999	
	AT-C	Averaging time (cancer)	days	25550	EPA, 1999	25550	EPA, 1999	
	AT-NC	Averaging time (non-cancer)	days	8760	EPA, 1999	2555	EPA, 1999	
	VF	Volatilization factor	unitless	5.00E-01	EPA, 1999	5.00E-01	EPA, 1999	

TABLE 4.1b

VALUES USED FOR DAILY INTAKE CALCULATIONS

EVERGREEN MANOR SITE, ROSCOE, WINNEBAGO COUNTY, ILLINOIS

Scenario Timeframe:	Current/Future
Medium:	Groundwater
Exposure Medium:	Groundwater
Exposure Point:	Tap water
Receptor Population:	Resident
Receptor Age:	Child

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CW	Chemical concentration in water	ug/L	See Table 3	See Table 3	See Table 3	See Table 3	CDI (mg/kg/d) = CW x IR x 1E-03 mg/ug x EF x ED / (BW x AT)
	IR-W	Ingestion rate of water	L/day	1	EPA, 1999	0.7	EPA, 1997	
	EF	Exposure frequency	days/yr	350	EPA, 1999	350	EPA, 1999	
	ED	Exposure duration	years	6	EPA, 1999	2	Professional judgement, see Sec. 3.3	
	BW	Body weight	kg	15	EPA, 1999	15	EPA, 1999	
	AT-C	Averaging time (cancer)	days	25550	EPA, 1999	25550	EPA, 1999	
	AT-NC	Averaging time (non-cancer)	days	2190	EPA, 1999	730	EPA, 1999	
Dermal absorption	CW	Chemical concentration in water	mg/L	See Table 3	See Table 3	See Table 3	See Table 3	CDI (mg/kg/d) = CW x SA x PC x 1L/1000 cm3 x ET x EF x ED x 1/BW x 1/AT
	SA	Surface area available for contact	cm²	6536	EPA., 1997	7314	EPA, 1997	
	PC	Permeability constant	cm/hr	chemical specific	EPA, 1992a	chemical specific	EPA, 1992a	
	ET	Exposure time	hrs/day	0.75	EPA, 1997	0.33	EPA, 1997	
	EF	Exposure frequency	days/yr	350	EPA, 1999	350	EPA, 1999	
	ED	Exposure duration	years	6	EPA, 1999	2	Professional judgement, see Sec. 3.3	
	BW	Body weight	kg	15	EPA, 1999	15	EPA, 1999	
	AT-C	Averaging time (cancer)	days	25550	EPA, 1999	25550	EPA, 1999	
	AT-NC	Averaging time (non-cancer)	days	2190	EPA, 1999	730	EPA, 1999	
Inhalation of vapors	CW	Chemical concentration in water	mg/L	See Table 3	See Table 3	See Table 3	See Table 3	CDI (mg/kg-d) = CW x IR-A x EF x ED x K x 1/BW x 1/AT
	IR-A	Inhalation rate of indoor air	m³/day	8.7	EPA, 1999	8.7	EPA, 1999	
	EF	Exposure frequency	days/yr	350	EPA, 1999	350	EPA, 1991c	
	ED	Exposure duration	years	6	EPA, 1999	2	Professional judgement, see Sec. 3.3	
	BW	Body weight	kg	15	EPA, 1999	15	EPA, 1999	
	AT-C	Averaging time (cancer)	days	25550	EPA, 1999	25550	EPA, 1999	
	AT-NC	Averaging time (non-cancer)	days	2190	EPA, 1999	730	EPA, 1999	
	VF	Volatilization factor	unitless	5.00E-01	EPA, 1999	5.00E-01	EPA, 1999	

TABLE 4.2

VALUES SED FOR DAILY INTAKE CALCULATIONS

EVERGREEN MAN . R SITE, ROSCOE, WINNEBAGO COUNTY, ILLINOIS

Scenario Timeframe:	Current/Future
Medium:	Groundwater
Exposure Medium:	Groundwater
Exposure Point:	Tap water
Receptor Population:	Commercial/Industrial
Receptor Age:	Worker

Exposure Route	Parameter Code	Parameter Definition	nits	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CW	Chemical concentration in water	g/L	See Table 3	See Table 3	See Table 3	See Table 3	
	IR-W	Ingestion rate of water	day	1	EPA, 1999	0.7	EPA, 1997	CDI (mg/kg/d) = CW x IR x 1E-03 mg/ug x EF x ED / (BW x AT)
	EF	Exposure frequency	/s/yr	250	EPA, 1999	250	EPA, 1991c	
	EDc	Exposure duration -carcinogens	rs	25	EPA, 1999	9	EPA, 1997	
	EDnc	Exposure duration - noncarcinogens	rs	25	EPA, 1999	9	EPA, 1997	
	BW	Body weight	g	70	EPA, 1999	70	EPA, 1999	
	AT-C	Averaging time (cancer)	ys	25550	EPA, 1999	25550	EPA, 1999	
	AT-NC	Averaging time (non-cancer)	ys	9125	EPA, 1999	2555	EPA, 1999	
Dermal absorption	CW	Chemical concentration in water	g/L	See Table 3	See Table 3	See Table 3	See Table 3	
	SA	Surface area available for contact	m^2	23000	EPA, 1992a	20000	EPA, 1992a	CDI (mg/kg/d) = CW x SA x PC x 1L/1000 cm3 x ET x EF x ED x 1/BW x 1/AT
	PC	Permeability constant	/hr	chemical specific	EPA, 1992a	chemical specific	EPA, 1992a	
	ET	Exposure time	/day	0.75	EPA, 1997	0.33	EPA, 1997	
	EF	Exposure frequency	/s/yr	250	EPA, 1991c	250	EPA, 1991c	
	EDc	Exposure duration -carcinogens	rs	25	EPA, 1999	9	EPA, 1997	
	EDnc	Exposure duration - noncarcinogens	rs	25	EPA, 1999	9	EPA, 1997	
	BW	Body weight	g	70	EPA, 1999	70	EPA, 1999	
	AT-C	Averaging time (cancer)	ys	25550	EPA, 1999	25550	EPA, 1999	
	AT-NC	Averaging time (non-cancer)	ys	9125	EPA, 1999	2555	EPA, 1999	
Inhalation of vapors	CW	Chemical concentration in water	g/L	See Table 3	See Table 3	See Table 3	See Table 3	
	IR-A	Inhalation rate of indoor air	day	15	EPA, 1999	15	EPA, 1999	CDI (mg/kg-d) = CW x IR-A x EF x ED x K x 1/BW x 1/AT
	EF	Exposure frequency	/yr	250	EPA, 1999	250	EPA, 1999	
	EDc	Exposure duration -carcinogens	rs	25	EPA, 1999	9	EPA, 1997	
	EDnc	Exposure duration - noncarcinogens	rs	25	EPA, 1999	9	EPA, 1997	
	BW	Body weight	g	70	EPA, 1999	70	EPA, 1999	
	AT-C	Averaging time (cancer)	ys	25550	EPA, 1999	25550	EPA, 1999	
	AT-NC	Averaging time (non-cancer)	ys	9125	EPA, 1999	2555	EPA, 1999	
	VF	Volatilization factor	ess	5.00E-01	EPA, 1999	5.00E-01	EPA, 1999	

TABLE 5.1

NON-CA CER TOXICITY DATA – ORAL/DERMAL

EVERGREEN MANOR SITE

ROSC E, **WINNEBAGO** COUNTY, ILLINOIS

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD Value	Oral RfD Units	Oral to ermal Adjustmen Factor (1)	Adjusted Dermal RfD (2)	Units	Primary Target Organ	Combined Uncertainty/Modifying Factors	Sources of RfD: Target Organ	Dates of RfD: Target Organ (3) (MM/DD/YY)
Acetone	Subchronic	1.00E-01	mg/kg-day		1.00E-01	mg/kg-day	liver/kidney	1000	IRIS	7/7/00
cis-1,2-Dichloroethene	Subchronic	1.00E-02	mg/kg-day		1.00E-02	mg/kg-day	blood	3000	HEAST/Region IX	11/29/99
Chloroform	Chronic	1.00E-02	mg/kg-day		1.00E-02	mg/kg-day	liver	1000	IRIS	7/7/00
Benzene	N/A	3.00E-03	mg/kg-day		3.00E-03	mg/kg-day	N/A	N/A	NCEA/Region IX	11/29/99
Trichloroethene	N/A	6.00E-03	mg/kg-day		6.00E-03	mg/kg-day	N/A	N/A	Withdrawn/Region IX	11/29/99
Toluene	Chronic	2.00E-01	mg/kg-day		2.00E-01	mg/kg-day	liver/kidney	1000	IRIS	7/7/00
Tetrachloroethene	Subchronic	1.00E-02	mg/kg-day		1.00E-02	mg/kg-day	liver	1000	IRIS	7/7/00
1,1,1-Trichloroethane	N/A	3.50E-02	mg/kg-day		3.50E-02	mg/kg-day	N/A	N/A	NCEA/Region IX	11/29/99
1,1,2-Trichloro-1,2,2-trifluoromethane	N/A	N/A	N/A	N	N/A	N/A	N/A	N/A	N/A	N/A
Methylene chloride	Chronic	6.00E-02	mg/kg-day		6.00E-02	mg/kg-day	liver	100	IRIS	7/7/00
2-Butanone	Chronic	6.00E-01	mg/kg-day		6.00E-01	mg/kg-day	decrease fetal body weight	3000	IRIS	7/7/00
m-&/or p-Xylene	Chronic	2.00E+00	mg/kg-day		2.00E+00	mg/kg-day	hyperactivity, decreased body weight, increased mortality	100	IRIS	7/7/00
Ethylbenzene	Subchronic	1.00E-01	mg/kg-day		1.00E-01	mg/kg-day	liver/kidney	1000	IRIS	7/7/00

N/A = Not Applicable

(1) Refer to RAGS, Part A; Complete (100%) oral absorption is assumed due to a lack of scientifically defensible da base on GI absoprtion factors (EPA, 1989) See Section 4.

(2) Dermal RfD assumed to equal oral RfD. See Section 4.

(3) For IRIS values, provide the date IRIS was searched.
For HEAST values, provide the date of HEAST.
For NCEA values, provide the date of the article provided by NCEA.
Region IX = Region IX Risk-Based Concentration Table.

TABLE 5.2

NON- ANCER TOXICITY DATA – INHALATION

EVERGREEN MANOR SITE

RO OE, WINNEBAGO COUNTY, ILLINOIS

Chemical of Potential Concern	Chronic/ Subchronic	Value Inhalation RfC	Units	ijusted alation fD (1)	Units	Primary Target Organ	Combined Uncertainty/Modifying Factors	Sources of RfC RfD: Target Organ	Dates (2) (MM/DD/YY)
Acetone	Subchronic	N/A	N/A	0E-01	mg/kg-day	liver/kidney	1000	Route extrapolation	7/7/00
cis-1,2-Dichloroethene	Subchronic	N/A	N/A	0E-02	mg/kg-day	blood	3000	Route extrapolation/Region IX	11/29/99
Chloroform	Chronic	3.00E-04	mg/m3	0E-05	mg/kg-day	liver	1000	HEAST/Region IX	11/29/99
Benzene	N/A	6.00E-03	mg/m3	0E-03	mg/kg-day	N/A	N/A	NCEA/Region IX	11/29/99
Trichloroethene	N/A	2.10E-02	mg/m3	0E-03	mg/kg-day	N/A	N/A	Route extrapolation/Region IX	11/29/99
Toluene	Chronic	4.00E-01	mg/m3	0E-01	mg/kg-day	neurological	300	Route extrapolation	7/7/00
Tetrachloroethene	Subchronic	3.90E-01	mg/m3	0E-01	mg/kg-day	liver	1000	NCEA/Region IX	11/29/99
1,1,1-Trichloroethane	N/A	N/A	N/A	0E-01	mg/kg-day	N/A	N/A	NCEA/Region IX	11/29/99
1,1,2-Trichloro-1,2,2-trifluoromethane	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Methylene chloride	N/A	N/A	N/A	0E-01	mg/kg-day	N/A	N/A	HEAST/Region IX	11/29/99
2-Butanone	Chronic	1.00E+00	mg/m3	9E-1	mg/kg-day	decreased fetal body weight	3000	IRIS	7/7/00
m-&/or p-Xylene	N/A	N/A	N/A	0E-01	mg/kg-day	N/A	N/A	withdrawn/Region IX	11/29/99
Ethylbenzene	Chronic	1.00E+00	mg/m3	9E-1	mg/kg-day	developmental	300	IRIS	7/7/00

N/A = Not Applicable

(1) See Section 4 in text.

(2) For IRIS values, provide the date IRIS was searched.

For HEAST values, provide the date of HEAST.

For NCEA values, provide the date of the article provided by NCEA.

Region IX = Region IX Risk-Based Concentration Table.

TABLE 6.1

CANCER TOXICITY DATA – ORAL/DERMAL

EVERGREEN MANOR SITE

ROSCOE, WINNEBAGO COUNTY, ILLINOIS

Chemical of Potential Concern	Oral Cancer Slope Factor	Oral to Dermal Adjustment Factor	Adjusted Dermal Cancer Slope Factor (1)	Units	Weight of Evidence/ Cancer Guideline Description	Source Target Organ	Date (2) (MM/DD/YY)
Acetone	N/A	N/A	N/A	N/A	D	IRIS	7/7/00
cis-1,2-Dichloroethene	N/A	N/A	N/A	N/A	D	IRIS	7/7/00
Chloroform	6.10E-03	1	6.10E-03	$(mg/kg\text{-}day)^{-1}$	B2/all kidney tumors	IRIS	7/7/00
Benzene	1.5E-02 to 5.5E-02	1	1.5E-02 to 5.5E-02	$(mg/kg\text{-}day)^{-1}$	A/leukemia	IRIS	7/7/00
Trichloroethene	1.10E-02	1	1.10E-02	$(mg/kg\text{-}day)^{-1}$	N/A	NCEA/Region IX	11/29/99
Toluene	N/A	N/A	N/A	N/A	D	IRIS	7/7/00
Tetrachloroethene	5.20E-02	1	5.20E-02	$(mg/kg\text{-}day)^{-1}$	liver	NCEA/Region IX	11/29/99
1,1,1-Trichloroethane	N/A	N/A	N/A	N/A	D	IRIS	7/7/00
1,1,2-Trichloro-1,2,2-trifluoromethane	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Methylene chloride	7.50E-03	1	7.50E-03	$(mg/kg\text{-}day)^{-1}$	B2/hepatocellular	IRIS	7/7/00
2-Butanone	N/A	N/A	N/A	N/A	D	IRIS	7/7/00
m-&/or p-Xylene	N/A	N/A	N/A	N/A	D	IRIS	7/7/00
Ethylbenzene	N/A	N/A	N/A	N/A	D	IRIS	7/7/00

(1) Refer to RAGS Part A and Section 4 of text.
Complete (1(100%) oral absorption is assumed due to a lack of scientifically defensible database on GI absorption factors (EPA, 1989).

(2) For IRIS values, provide the date IRIS was searched.
For HEAST values, provide the date of HEAST.
For NCEA values, provide the date of article provided by NCEA.
REGION IX = Region IX Preliminary remediation goals.
RPA = Relative Potency Approach (EPA, 1993a)

EPA Group:
A - Human carcinogen
B1 - Probable human carcinogen - indicates that limited human data are available
B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans
C - Possible human carcinogen
D - Not classifiable as a human carcinogen
E - Evidence of noncarcinogenicity

Weight of Evidence:
Known/Likely
Cannot be Determined
Not Likely

TABLE 6.2

CAN ER TOXICITY DATA – INHALATION

EVERGREEN MANOR SITE

ROSC)E, WINNEBAGO COUNTY, ILLINOIS

Chemical of Potential Concern	Unit Risk	Units	A: stment	Inhalation Cancer Slope Factor	Units	Weight of Evidence/ Cancer Guideline Description	Source	Date (1) (MM/DD/YY)
Acetone	N/A	N/A	N/A	N/A	N/A	D	IRIS	7/7/00
cis-1,2-Dichloroethene	N/A	N/A	N/A	N/A	N/A	D	IRIS	7/7/00
Chloroform	2.30E-05	$(ug/m3)^{-1}$	500	8.10E-02	$(mg/kg-day)^{-1}$	B2/hepatocellular carcinoma	IRIS	7/7/00
Benzene	2.2E-06 to 7.8E-06	$(ug/m3)^{-1}$	500	7.7E-03 to 2.73E-02	$(mg/kg-day)^{-1}$	A/leukemia	IRIS	7/7/00
Trichloroethene	1.70E-06	$(ug/m3)^{-1}$	500	6.00E-03	$(mg/kg-day)^{-1}$	N/A	NCEA/Region IX	11/29/99
Toluene	N/A	N/A	N/A	N/A	N/A	D	IRIS	7/7/00
Tetrachloroethene	5.70E-07	$(ug/m3)^{-1}$	500	2.00E-03	$(mg/kg-day)^{-1}$	liver	NCEA/Region IX	11/29/99
1,1,1-Trichloroethane	N/A	N/A	N/A	N/A	N/A	D	IRIS	7/7/00
1,1,2-Trichloro-1,2,2-trifluoromethane	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Methylene chloride	4.70E-07	$(ug/m3)^{-1}$	3 0E+03	1.60E-03	$(mg/kg-day)^{-1}$	B2/combined adenomas & carcinomas	IRIS	7/7/00
2-Butanone	N/A	N/A	N/A	N/A	N/A	D	IRIS	7/7/00
m-&/or p-Xylene	N/A	N/A	N/A	N/A	N/A	D	IRIS	7/7/00
Ethylbenzene	N/A	N/A	N/A	N/A	N/A	D	IRIS	7/7/00

(1) For IRIS values, provide the date IRIS was searched.
For HEAST values, provide the date of HEAST.
For NCEA values, provide the date of article provided by NCEA.
REGION IX = Region IX Preliminary remediation goals.
RPA = Relative Potency Approach (EPA, 1993a)

EPA Group:
A - Human carcinogen
B1 - Probable human carcinogen - indicates that limited human data are available
B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans
C - Possible human carcinogen
D - Not classifiable as a human carcinogen
E - Evidence of noncarcinogenicity

Weight of Evidence:
Known/Likely
Cannot be Determined
Not Likely

TABLE 7.1.CT
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
EVERGREEN MANOR SITE, ROSCOE, WINNEBAGO COUNTY, ILLINOIS

Scenario Timeframe:	Current/Future
Medium:	Groundwater
Exposure Medium:	Groundwater
Exposure Point:	Tap water
Receptor Population:	Resident
Receptor Age:	Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion													
	Acetone	100	ug/L	100	ug/L	M	1.918E-03	mg/kg-d	1.00E-01	mg/kg-d	–	–	1.918E-02
	Trichloroethene	6	ug/L	6	ug/L	M	1.151E-04	mg/kg-d	6.00E-03	mg/kg-d	–	–	1.918E-02
	Tetrachloroethene	9	ug/L	9	ug/L	M	1.726E-04	mg/kg-d	1.00E-02	mg/kg-d	–	–	1.726E-02
	Chloroform	0.9	ug/L	0.9	ug/L	M	1.726E-05	mg/kg-d	1.00E-02	mg/kg-d	–	–	1.726E-03
	Benzene	0.6	ug/L	0.6	ug/L	M	1.151E-05	mg/kg-d	3.00E-03	mg/kg-d	–	–	3.836E-03
	Methylene chloride	0.5	ug/L	0.5	ug/L	M	9.589E-06	mg/kg-d	6.00E-02	mg/kg-d	–	–	1.598E-04
	(Total)												6.1E-02
Dermal absorption													
	Acetone	100	ug/L	100	ug/L	M	2.655E-06	mg/kg-d	1.00E-01	mg/kg-d	–	–	2.655E-05
	Trichloroethene	6	ug/L	6	ug/L	M	4.471E-06	mg/kg-d	6.00E-03	mg/kg-d	–	–	7.452E-04
	Tetrachloroethene	9	ug/L	9	ug/L	M	2.012E-05	mg/kg-d	1.00E-02	mg/kg-d	–	–	2.012E-03
	Chloroform	0.9	ug/L	0.9	ug/L	M	3.731E-07	mg/kg-d	1.00E-02	mg/kg-d	–	–	3.731E-05
	Benzene	0.6	ug/L	0.6	ug/L	M	5.868E-07	mg/kg-d	3.00E-03	mg/kg-d	–	–	1.956E-04
	Methylene chloride	0.5	ug/L	0.5	ug/L	M	1.048E-07	mg/kg-d	6.00E-02	mg/kg-d	–	–	1.747E-06
	(Total)												3.0E-03
Inhalation													
	Acetone	100	ug/L	100	ug/L	M	1.027E-02	mg/kg-d	1.00E-01	mg/kg-d	1.0E-01	mg/kg-d	1.027E-01
	Trichloroethene	6	ug/L	6	ug/L	M	6.164E-04	mg/kg-d	6.00E-03	mg/kg-d	6.0E-03	mg/kg-d	1.027E-01
	Tetrachloroethene	9	ug/L	9	ug/L	M	9.247E-04	mg/kg-d	1.00E-02	mg/kg-d	1.1E-01	mg/kg-d	8.406E-03
	Chloroform	0.9	ug/L	0.9	ug/L	M	9.247E-05	mg/kg-d	1.00E-02	mg/kg-d	8.6E-05	mg/kg-d	1.075E+00
	Benzene	0.6	ug/L	0.6	ug/L	M	6.164E-05	mg/kg-d	3.00E-03	mg/kg-d	1.7E-03	mg/kg-d	3.626E-02
	Methylene chloride	0.5	ug/L	0.5	ug/L	M	5.137E-05	mg/kg-d	6.00E-02	mg/kg-d	8.6E-01	mg/kg-d	5.973E-05
	(Total)												1.3E+00
												Total Hazard Index Across All Exposure Routes/Pathways	1.4E+00

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.
(2) Specify if subchronic.

N/A = Not Applicable

TABLE 7.1.RME
CALCU ATION OF NON-CANCER HAZARDS
REA ONABLE MAXIMUM EXPOSURE
EVERGREEN MANOI SITE, ROSCOE, WINNEBAGO COUNTY, ILLINOIS

Scenario Timeframe:	Current/Future
Medium:	Groundwater
Exposure Medium:	Groundwater
Exposure Point:	Tap water
Receptor Population:	Resident
Receptor Age:	Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion													
	Acetone	100	ug/L	100	ug/L	M	2.740E-03	mg/kg-d	1.00E-01	mg/kg-d	--	--	2.740E-02
	Trichloroethene	6	ug/L	6	ug/L	M	1.644E-04	mg/kg-d	6.00E-03	mg/kg-d	--	--	2.740E-02
	Tetrachloroethene	9	ug/L	9	ug/L	M	2.466E-04	mg/kg-d	1.00E-02	mg/kg-d	--	--	2.466E-02
	Chloroform	0.9	ug/L	0.9	ug/L	M	2.466E-05	mg/kg-d	1.00E-02	mg/kg-d	--	--	2.466E-03
	Benzene	0.6	ug/L	0.6	ug/L	M	1.644E-05	mg/kg-d	3.00E-03	mg/kg-d			5.479E-03
	Methylene chloride	0.5	ug/L	0.5	ug/L	M	1.370E-05	mg/kg-d	6.00E-02	mg/kg-d	--	--	2.283E-04
	(Total)												8.8E-02
Dermal absorption													
	Acetone	100	ug/L	100	ug/L	M	1.042E-05	mg/kg-d	1.00E-01	mg/kg-d	--	--	1.042E-04
	Trichloroethene	6	ug/L	6	ug/L	M	1.754E-05	mg/kg-d	6.00E-03	mg/kg-d	--	--	2.924E-03
	Tetrachloroethene	9	ug/L	9	ug/L	M	7.894E-05	mg/kg-d	1.00E-02	mg/kg-d	--	--	7.894E-03
	Chloroform	0.9	ug/L	0.9	ug/L	M	1.464E-06	mg/kg-d	1.00E-02	mg/kg-d	--	--	1.464E-04
	Benzene	0.6	ug/L	0.6	ug/L	M	2.303E-06	mg/kg-d	3.00E-03	mg/kg-d	--	--	7.675E-04
	Methylene chloride	0.5	ug/L	0.5	ug/L	M	4.112E-07	mg/kg-d	6.00E-02	mg/kg-d	--	--	6.853E-06
	(Total)												1.2E-02
Inhalation													
	Acetone	100	ug/L	100	ug/L	M	1.027E-02	mg/kg-d	1.00E-01	mg/kg-d	1.0E-01	mg/kg-d	1.027E-01
	Trichloroethene	6	ug/L	6	ug/L	M	6.164E-04	mg/kg-d	6.00E-03	mg/kg-d	6.0E-03	mg/kg-d	1.027E-01
	Tetrachloroethene	9	ug/L	9	ug/L	M	9.247E-04	mg/kg-d	1.00E-02	mg/kg-d	1.1E-01	mg/kg-d	8.406E-03
	Chloroform	0.9	ug/L	0.9	ug/L	M	9.247E-05	mg/kg-d	1.00E-02	mg/kg-d	8.6E-05	mg/kg-d	1.075E+00
	Benzene	0.6	ug/L	0.6	ug/L	M	6.164E-05	mg/kg-d	3.00E-03	mg/kg-d	1.7E-03	mg/kg-d	3.626E-02
	Methylene chloride	0.5	ug/L	0.5	ug/L	M	5.137E-05	mg/kg-d	6.00E-02	mg/kg-d	8.6E-01	mg/kg-d	5.973E-05
	(Total)												1.3E+00
												Total Hazard Index Across All Exposure Routes/Pathways	1.4E+00

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.
(2) Specify if subchronic.

N/A = Not Applicable

TABLE 7.2.CT
CALCU ATION OF NON-CANCER HAZARDS
CE ITRAL TENDENCY EXPOSURE
EVERGREEN MANOF SITE, ROSCOE, WINNEBAGO COUNTY, ILLINOIS

Scenario Timeframe:	Current/Future
Medium:	Groundwater
Exposure Medium:	Groundwater
Exposure Point:	Tap water
Receptor Population:	Resident
Receptor Age:	Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion													
	Acetone	100	ug/L	100	ug/L	M	4.475E-03	mg/kg-d	1.00E-01	mg/kg-d	--	--	4.475E-02
	Trichloroethene	6	ug/L	6	ug/L	M	2.685E-04	mg/kg-d	6.00E-03	mg/kg-d	--	--	4.475E-02
	Tetrachloroethene	9	ug/L	9	ug/L	M	4.027E-04	mg/kg-d	1.00E-02	mg/kg-d	--	--	4.027E-02
	Chloroform	0.9	ug/L	0.9	ug/L	M	4.027E-05	mg/kg-d	1.00E-02	mg/kg-d			4.027E-03
	Benzene	0.6	ug/L	0.6	ug/L	M	2.685E-05	mg/kg-d	3.00E-03	mg/kg-d			8.950E-03
	Methylene chloride	0.5	ug/L	0.5	ug/L	M	2.237E-05	mg/kg-d	6.00E-02	mg/kg-d	--	--	3.729E-04
	(Total)												1.4E-01
Dermal absorption													
	Acetone	100	ug/L	100	ug/L	M	4.531E-06	mg/kg-d	1.00E-01	mg/kg-d	--	--	4.531E-05
	Trichloroethene	6	ug/L	6	ug/L	M	7.631E-06	mg/kg-d	6.00E-03	mg/kg-d	--	--	1.272E-03
	Tetrachloroethene	9	ug/L	9	ug/L	M	3.434E-05	mg/kg-d	1.00E-02	mg/kg-d	--	--	3.434E-03
	Chloroform	0.9	ug/L	0.9	ug/L	M	6.367E-07	mg/kg-d	1.00E-02	mg/kg-d			6.367E-05
	Benzene	0.6	ug/L	0.6	ug/L	M	1.002E-06	mg/kg-d	3.00E-03	mg/kg-d			3.338E-04
	Methylene chloride	0.5	ug/L	0.5	ug/L	M	1.788E-07	mg/kg-d	6.00E-02	mg/kg-d	--	--	2.981E-06
	(Total)												5.2E-03
Inhalation													
	Acetone	100	ug/L	100	ug/L	M	2.781E-02	mg/kg-d	1.00E-01	mg/kg-d	1.0E-01	mg/kg-d	2.781E-01
	Trichloroethene	6	ug/L	6	ug/L	M	1.668E-03	mg/kg-d	6.00E-03	mg/kg-d	6.0E-03	mg/kg-d	2.781E-01
	Tetrachloroethene	9	ug/L	9	ug/L	M	2.503E-03	mg/kg-d	1.00E-02	mg/kg-d	1.1E-01	mg/kg-d	2.275E-02
	Chloroform	0.9	ug/L	0.9	ug/L	M	2.503E-04	mg/kg-d	1.00E-02	mg/kg-d	8.6E-05	mg/kg-d	2.910E+00
	Benzene	0.6	ug/L	0.6	ug/L	M	1.668E-04	mg/kg-d	3.00E-03	mg/kg-d	1.7E-03	mg/kg-d	9.815E-02
	Methylene chloride	0.5	ug/L	0.5	ug/L	M	1.390E-04	mg/kg-d	6.00E-02	mg/kg-d	8.6E-01	mg/kg-d	1.617E-04
	(Total)												3.6E+00
												Total Hazard Index Across All Exposure Routes/Pathways	3.7E+00

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.
(2) Specify if subchronic.

N/A = Not Applicable

TABLE 7.2.RME
CALCU ATION OF NON-CANCER HAZARDS
REA ONABLE MAXIMUM EXPOSURE
EVERGREEN MANOI SITE, ROSCOE, WINNEBAGO COUNTY, ILLINOIS

Scenario Timeframe:	Current/Future
Medium:	Groundwater
Exposure Medium:	Groundwater
Exposure Point:	Tap water
Receptor Population:	Resident
Receptor Age:	Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion													
	Acetone	100	ug/L	100	ug/L	M	6.393E-03	mg/kg-d	1.00E-01	mg/kg-d	--	--	6.393E-02
	Trichloroethene	6	ug/L	6	ug/L	M	3.836E-04	mg/kg-d	6.00E-03	mg/kg-d	--	--	6.393E-02
	Tetrachloroethene	9	ug/L	9	ug/L	M	5.753E-04	mg/kg-d	1.00E-02	mg/kg-d	--	--	5.753E-02
	Chloroform	0.9	ug/L	0.9	ug/L	M	5.753E-05	mg/kg-d	1.00E-02	mg/kg-d	--	--	5.753E-03
	Benzene	0.6	ug/L	0.6	ug/L	M	3.836E-05	mg/kg-d	3.00E-03	mg/kg-d			1.279E-02
	Methylene chloride	0.5	ug/L	0.5	ug/L	M	3.196E-05	mg/kg-d	6.00E-02	mg/kg-d	--	--	5.327E-04
	(Total)												2.0E-01
Dermal absorption													
	Acetone	100	ug/L	100	ug/L	M	1.804E-05	mg/kg-d	1.00E-01	mg/kg-d	--	--	1.804E-04
	Trichloroethene	6	ug/L	6	ug/L	M	3.039E-05	mg/kg-d	6.00E-03	mg/kg-d	--	--	5.065E-03
	Tetrachloroethene	9	ug/L	9	ug/L	M	1.368E-04	mg/kg-d	1.00E-02	mg/kg-d	--	--	1.368E-02
	Chloroform	0.9	ug/L	0.9	ug/L	M	2.536E-06	mg/kg-d	1.00E-02	mg/kg-d	--	--	2.536E-04
	Benzene	0.6	ug/L	0.6	ug/L	M	3.969E-06	mg/kg-d	3.00E-03	mg/kg-d	--	--	1.330E-03
	Methylene chloride	0.5	ug/L	0.5	ug/L	M	7.123E-07	mg/kg-d	6.00E-02	mg/kg-d	--	--	1.187E-05
	(Total)												2.1E-02
Inhalation													
	Acetone	100	ug/L	100	ug/L	M	2.781E-02	mg/kg-d	1.00E-01	mg/kg-d	1.0E-01	mg/kg-d	2.781E-01
	Trichloroethene	6	ug/L	6	ug/L	M	1.668E-03	mg/kg-d	6.00E-03	mg/kg-d	6.0E-03	mg/kg-d	2.781E-01
	Tetrachloroethene	9	ug/L	9	ug/L	M	2.503E-03	mg/kg-d	1.00E-02	mg/kg-d	1.1E-01	mg/kg-d	2.275E-02
	Chloroform	0.9	ug/L	0.9	ug/L	M	2.503E-04	mg/kg-d	1.00E-02	mg/kg-d	8.6E-05	mg/kg-d	2.910E+00
	Benzene	0.6	ug/L	0.6	ug/L	M	1.668E-04	mg/kg-d	3.00E-03	mg/kg-d	1.7E-03	mg/kg-d	9.815E-02
	Methylene chloride	0.5	ug/L	0.5	ug/L	M	1.390E-04	mg/kg-d	6.00E-02	mg/kg-d	8.6E-01	mg/kg-d	1.617E-04
	(Total)												3.6E+00
												Total Hazard Index Across All Exposure Routes/Pathways	3.8E+00

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.
(2) Specify if subchronic.

N/A = Not Applicable

TABLE 7.3.CT
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
EVERGREEN MANOR SITE, ROSCOE, WINNEBAGO COUNTY, ILLINOIS

Scenario Timeframe:	Future
Medium:	Groundwater
Exposure Medium:	Groundwater
Exposure Point:	Tap water
Receptor Population:	Commercial/Industrial
Receptor Age:	Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion													
	Acetone	100	ug/L	100	ug/L	M	6.849E-04	mg/kg-d	1.00E-01	mg/kg-d	--	--	6.849E-03
	Trichloroethene	6	ug/L	6	ug/L	M	4.110E-05	mg/kg-d	6.00E-03	mg/kg-d	--	--	6.849E-03
	Tetrachloroethene	9	ug/L	9	ug/L	M	6.164E-05	mg/kg-d	1.00E-02	mg/kg-d	--	--	6.164E-03
	Chloroform	0.9	ug/L	0.9	ug/L	M	6.164E-06	mg/kg-d	1.00E-02	mg/kg-d	--	--	6.164E-04
	Benzene	0.6	ug/L	0.6	ug/L	M	4.110E-06	mg/kg-d	3.00E-03	mg/kg-d	--	--	1.370E-03
	Methylene chloride	0.5	ug/L	0.5	ug/L	M	3.425E-06	mg/kg-d	6.00E-02	mg/kg-d	--	--	5.708E-05
	(Total)												2.2E-02
Dermal absorption													
	Acetone	100	ug/L	100	ug/L	M	1.896E-06	mg/kg-d	1.00E-01	mg/kg-d	--	--	1.896E-05
	Trichloroethene	6	ug/L	6	ug/L	M	3.194E-06	mg/kg-d	6.00E-03	mg/kg-d	--	--	5.323E-04
	Tetrachloroethene	9	ug/L	9	ug/L	M	1.437E-05	mg/kg-d	1.00E-02	mg/kg-d	--	--	1.437E-03
	Chloroform	0.9	ug/L	0.9	ug/L	M	2.665E-07	mg/kg-d	1.00E-02	mg/kg-d	--	--	2.665E-05
	Benzene	0.6	ug/L	0.6	ug/L	M	4.192E-07	mg/kg-d	3.00E-03	mg/kg-d	--	--	1.397E-04
	Methylene chloride	0.5	ug/L	0.5	ug/L	M	7.485E-08	mg/kg-d	6.00E-02	mg/kg-d	--	--	1.248E-06
	(Total)												2.2E-03
Inhalation													
	Acetone	100	ug/L	100	ug/L	M	7.339E-03	mg/kg-d	1.00E-01	mg/kg-d	1.0E-01	mg/kg-d	7.339E-02
	Trichloroethene	6	ug/L	6	ug/L	M	4.403E-04	mg/kg-d	6.00E-03	mg/kg-d	6.0E-03	mg/kg-d	7.339E-02
	Tetrachloroethene	9	ug/L	9	ug/L	M	6.605E-04	mg/kg-d	1.00E-02	mg/kg-d	1.1E-01	mg/kg-d	6.004E-03
	Chloroform	0.9	ug/L	0.9	ug/L	M	6.605E-05	mg/kg-d	1.00E-02	mg/kg-d	8.6E-05	mg/kg-d	7.680E-01
	Benzene	0.6	ug/L	0.6	ug/L	M	4.403E-05	mg/kg-d	3.00E-03	mg/kg-d	1.7E-03	mg/kg-d	2.590E-02
	Methylene chloride	0.5	ug/L	0.5	ug/L	M	3.669E-05	mg/kg-d	6.00E-02	mg/kg-d	8.6E-01	mg/kg-d	4.267E-05
	(Total)												9.5E-01
												Total Hazard Index Across All Exposure Routes/Pathways	9.7E-01

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.
(2) Specify if subchronic.

N/A = Not Applicable

TABLE 7.3.RME
CALCU ATION OF NON-CANCER HAZARDS
REA ONABLE MAXIMUM EXPOSURE
EVERGREEN MANOI SITE, ROSCOE, WINNEBAGO COUNTY, ILLINOIS

Scenario Timeframe:	Future
Medium:	Groundwater
Exposure Medium:	Groundwater
Exposure Point:	Tap water
Receptor Population:	Commercial/Industrial
Receptor Age:	Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion													
	Acetone	100	ug/L	100	ug/L	M	9.785E-04	mg/kg-d	1.00E-01	mg/kg-d	--	--	9.785E-03
	Trichloroethene	6	ug/L	6	ug/L	M	5.871E-05	mg/kg-d	6.00E-03	mg/kg-d	--	--	9.785E-03
	Tetrachloroethene	9	ug/L	9	ug/L	M	8.806E-05	mg/kg-d	1.00E-02	mg/kg-d	--	--	8.806E-03
	Chloroform	0.9	ug/L	0.9	ug/L	M	8.806E-06	mg/kg-d	1.00E-02	mg/kg-d	--	--	8.806E-04
	Benzene	0.6	ug/L	0.6	ug/L	M	5.871E-06	mg/kg-d	3.00E-03	mg/kg-d	--	--	1.957E-03
	Methylene chloride	0.5	ug/L	0.5	ug/L	M	4.892E-06	mg/kg-d	6.00E-02	mg/kg-d	--	--	8.154E-05
	(Total)												3.1E-02
Dermal absorption													
	Acetone	100	ug/L	100	ug/L	M	7.440E-06	mg/kg-d	1.00E-01	mg/kg-d	--	--	7.440E-05
	Trichloroethene	6	ug/L	6	ug/L	M	1.253E-05	mg/kg-d	6.00E-03	mg/kg-d	--	--	2.088E-03
	Tetrachloroethene	9	ug/L	9	ug/L	M	5.639E-05	mg/kg-d	1.00E-02	mg/kg-d	--	--	5.639E-03
	Chloroform	0.9	ug/L	0.9	ug/L	M	1.046E-06	mg/kg-d	1.00E-02	mg/kg-d	--	--	1.046E-04
	Benzene	0.6	ug/L	0.6	ug/L	M	1.645E-06	mg/kg-d	3.00E-03	mg/kg-d	--	--	5.482E-04
	Methylene chloride	0.5	ug/L	0.5	ug/L	M	2.937E-07	mg/kg-d	6.00E-02	mg/kg-d	--	--	4.895E-06
	(Total)												6.5E-03
Inhalation													
	Acetone	100	ug/L	100	ug/L	M	7.339E-03	mg/kg-d	1.00E-01	mg/kg-d	1.0E-01	mg/kg-d	7.339E-02
	Trichloroethene	6	ug/L	6	ug/L	M	4.403E-04	mg/kg-d	6.00E-03	mg/kg-d	6.0E-03	mg/kg-d	7.339E-02
	Tetrachloroethene	9	ug/L	9	ug/L	M	6.605E-04	mg/kg-d	1.00E-02	mg/kg-d	1.1E-01	mg/kg-d	6.004E-03
	Chloroform	0.9	ug/L	0.9	ug/L	M	6.605E-05	mg/kg-d	1.00E-02	mg/kg-d	8.6E-05	mg/kg-d	7.680E-01
	Benzene	0.6	ug/L	0.6	ug/L	M	4.403E-05	mg/kg-d	3.00E-03	mg/kg-d	1.7E-03	mg/kg-d	2.590E-02
	Methylene chloride	0.5	ug/L	0.5	ug/L	M	3.669E-05	mg/kg-d	6.00E-02	mg/kg-d	8.6E-01	mg/kg-d	4.267E-05
	(Total)												9.5E-01
												Total Hazard Index Across All Exposure Routes/Pathways	9.9E-01

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.
(2) Specify if subchronic.

N/A = Not Applicable

TABLE 6.1.CT

CALCULATION OF CANCER RISKS

CENTRAL TENDENCY EXPOSURE

EVERGREEN MANOR SITE, ROSCOE, WINNEBAGO COUNTY, ILLINOIS

Scenario Timeframe:	Current/Future
Medium:	Groundwater
Exposure Medium:	Groundwater
Exposure Point:	Tap Water
Receptor Population:	Resident
Receptor Age:	Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion											
	Acetone	100	ug/L	100	ug/L	M	1.918E-04	mg/kg-d	NC	mg/kg-d^{-1}	–
	Trichloroethene	6	ug/L	6	ug/L	M	1.151E-05	mg/kg-d	1.10E-02	mg/kg-d^{-1}	1.27E-07
	Tetrachloroethene	9	ug/L	9	ug/L	M	1.726E-05	mg/kg-d	5.20E-02	mg/kg-d^{-1}	8.98E-07
	Chloroform	0.9	ug/L	0.9	ug/L	M	1.726E-06	mg/kg-d	6.10E-03	mg/kg-d^{-1}	1.05E-08
	Benzene	0.6	ug/L	0.6	ug/L	M	1.151E-06	mg/kg-d	5.50E-02	mg/kg-d^{-1}	6.33E-08
	Methylene chloride	0.5	ug/L	0.5	ug/L	M	9.589E-07	mg/kg-d	7.50E-03	mg/kg-d^{-1}	7.19E-09
	(Total)										1.11E-06
Dermal											
	Acetone	100	ug/L	100	ug/L	M	2.655E-07	mg/kg-d	NC	mg/kg-d^{-1}	–
	Trichloroethene	6	ug/L	6	ug/L	M	4.471E-07	mg/kg-d	1.10E-02	mg/kg-d^{-1}	4.92E-09
	Tetrachloroethene	9	ug/L	9	ug/L	M	2.012E-06	mg/kg-d	5.20E-02	mg/kg-d^{-1}	1.05E-07
	Chloroform	0.9	ug/L	0.9	ug/L	M	3.731E-08	mg/kg-d	6.10E-03	mg/kg-d^{-1}	2.28E-10
	Benzene	0.6	ug/L	0.6	ug/L	M	5.868E-08	mg/kg-d	5.50E-02	mg/kg-d^{-1}	3.23E-09
	Methylene chloride	0.5	ug/L	0.5	ug/L	M	1.048E-08	mg/kg-d	7.50E-03	mg/kg-d^{-1}	7.86E-11
	(Total)										1.13E-07
Inhalation											
	Acetone	100	ug/L	100	ug/L	M	1.027E-03	mg/kg-d	NC	mg/kg-d^{-1}	–
	Trichloroethene	6	ug/L	6	ug/L	M	6.164E-05	mg/kg-d	6.00E-03	mg/kg-d^{-1}	3.70E-07
	Tetrachloroethene	9	ug/L	9	ug/L	M	9.247E-05	mg/kg-d	2.00E-03	mg/kg-d^{-1}	1.85E-07
	Chloroform	0.9	ug/L	0.9	ug/L	M	9.247E-06	mg/kg-d	8.10E-02	mg/kg-d^{-1}	7.49E-07
	Benzene	0.6	ug/L	0.6	ug/L	M	6.164E-06	mg/kg-d	2.73E-02	mg/kg-d^{-1}	1.68E-07
	Methylene chloride	0.5	ug/L	0.5	ug/L	M	5.137E-06	mg/kg-d	1.60E-03	mg/kg-d^{-1}	8.22E-09
	(Total)										1.48E-06
										Total Hazard Index Across All Exposure Routes/Pathways	2.70E-06

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

N/A = Not Applicable

NC = Not carcinogenic.

TABLE 8.1.RME

C/ .CULATION OF CANCER RISKS

RE/ SONABLE MAXIMUM EXPOSURE

EVERGREEN MANO : SITE, ROSCOE, WINNEBAGO COUNTY, ILLINOIS

Scenario Timeframe:	Current/Future
Medium:	Groundwater
Exposure Medium:	Groundwater
Exposure Point:	Tap Water
Receptor Population:	Resident
Receptor Age:	Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion											
	Acetone	100	ug/L	100	ug/L	M	9.393E-04	mg/kg-d	NC	mg/kg-d^{-1}	–
	Trichloroethene	6	ug/L	6	ug/L	M	5.636E-05	mg/kg-d	1.10E-02	mg/kg-d^{-1}	6.20E-07
	Tetrachloroethene	9	ug/L	9	ug/L	M	8.454E-05	mg/kg-d	5.20E-02	mg/kg-d^{-1}	4.40E-06
	Chloroform	0.9	ug/L	0.9	ug/L	M	8.454E-06	mg/kg-d	6.10E-03	mg/kg-d^{-1}	5.16E-08
	Benzene	0.6	ug/L	0.6	ug/L	M	5.636E-06	mg/kg-d	5.50E-02	mg/kg-d^{-1}	3.10E-07
	Methylene chloride	0.5	ug/L	0.5	ug/L	M	4.697E-06	mg/kg-d	7.50E-03	mg/kg-d^{-1}	3.52E-08
	(Total)										5.41E-06
Dermal											
	Acetone	100	ug/L	100	ug/L	M	3.571E-06	mg/kg-d	NC	mg/kg-d^{-1}	–
	Trichloroethene	6	ug/L	6	ug/L	M	6.015E-06	mg/kg-d	1.10E-02	mg/kg-d^{-1}	6.62E-08
	Tetrachloroethene	9	ug/L	9	ug/L	M	2.707E-05	mg/kg-d	5.20E-02	mg/kg-d^{-1}	1.41E-06
	Chloroform	0.9	ug/L	0.9	ug/L	M	5.019E-07	mg/kg-d	6.10E-03	mg/kg-d^{-1}	3.06E-09
	Benzene	0.6	ug/L	0.6	ug/L	M	7.894E-07	mg/kg-d	5.50E-02	mg/kg-d^{-1}	4.34E-08
	Methylene chloride	0.5	ug/L	0.5	ug/L	M	1.410E-07	mg/kg-d	7.50E-03	mg/kg-d^{-1}	1.06E-09
	(Total)										1.52E-06
Inhalation											
	Acetone	100	ug/L	100	ug/L	M	3.523E-03	mg/kg-d	NC	mg/kg-d^{-1}	–
	Trichloroethene	6	ug/L	6	ug/L	M	2.114E-04	mg/kg-d	6.00E-03	mg/kg-d^{-1}	1.27E-06
	Tetrachloroethene	9	ug/L	9	ug/L	M	3.170E-04	mg/kg-d	2.00E-03	mg/kg-d^{-1}	6.34E-07
	Chloroform	0.9	ug/L	0.9	ug/L	M	3.170E-05	mg/kg-d	8.10E-02	mg/kg-d^{-1}	2.57E-06
	Benzene	0.6	ug/L	0.6	ug/L	M	2.114E-05	mg/kg-d	2.73E-02	mg/kg-d^{-1}	5.77E-07
	Methylene chloride	0.5	ug/L	0.5	ug/L	M	1.761E-05	mg/kg-d	1.60E-03	mg/kg-d^{-1}	2.82E-08
	(Total)										5.08E-06
										Total Hazard Index Across All Exposure Routes/Pathways	1.20E-05

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

N/A = Not Applicable

NC = Not carcinogenic.

TABLE 8.2.CT

CALCULATION OF CANCER RISKS

CENTRAL TENDENCY EXPOSURE

EVERGREEN MANOR SITE, ROSCOE, WINNEBAGO COUNTY, ILLINOIS

Scenario Timeframe:	Current/Future
Medium:	Groundwater
Exposure Medium:	Groundwater
Exposure Point:	Tap Water
Receptor Population:	Resident
Receptor Age:	Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion											
	Acetone	100	ug/L	100	ug/L	M	1.279E-04	mg/kg-d	NC	$mg/kg-d^{-1}$	--
	Trichloroethene	6	ug/L	6	ug/L	M	7.671E-06	mg/kg-d	1.10E-02	$mg/kg-d^{-1}$	8.44E-08
	Tetrachloroethene	9	ug/L	9	ug/L	M	1.151E-05	mg/kg-d	5.20E-02	$mg/kg-d^{-1}$	5.98E-07
	Chloroform	0.9	ug/L	0.9	ug/L	M	1.151E-06	mg/kg-d	6.10E-03	$mg/kg-d^{-1}$	7.02E-09
	Benzene	0.6	ug/L	0.6	ug/L	M	7.671E-07	mg/kg-d	5.50E-02	$mg/kg-d^{-1}$	4.22E-08
	Methylene chloride	0.5	ug/L	0.5	ug/L	M	6.393E-07	mg/kg-d	7.50E-03	$mg/kg-d^{-1}$	4.79E-09
	(Total)										7.37E-07
Dermal											
	Acetone	100	ug/L	100	ug/L	M	1.294E-07	mg/kg-d	NC	$mg/kg-d^{-1}$	--
	Trichloroethene	6	ug/L	6	ug/L	M	2.180E-07	mg/kg-d	1.10E-02	$mg/kg-d^{-1}$	2.40E-09
	Tetrachloroethene	9	ug/L	9	ug/L	M	9.811E-07	mg/kg-d	5.20E-02	$mg/kg-d^{-1}$	5.10E-08
	Chloroform	0.9	ug/L	0.9	ug/L	M	1.819E-08	mg/kg-d	6.10E-03	$mg/kg-d^{-1}$	1.11E-10
	Benzene	0.6	ug/L	0.6	ug/L	M	2.861E-08	mg/kg-d	5.50E-02	$mg/kg-d^{-1}$	1.57E-09
	Methylene chloride	0.5	ug/L	0.5	ug/L	M	5.110E-09	mg/kg-d	7.50E-03	$mg/kg-d^{-1}$	3.83E-11
	(Total)										5.51E-08
Inhalation											
	Acetone	100	ug/L	100	ug/L	M	7.945E-04	mg/kg-d	NC	$mg/kg-d^{-1}$	--
	Trichloroethene	6	ug/L	6	ug/L	M	4.767E-05	mg/kg-d	6.00E-03	$mg/kg-d^{-1}$	2.86E-07
	Tetrachloroethene	9	ug/L	9	ug/L	M	7.151E-05	mg/kg-d	2.00E-03	$mg/kg-d^{-1}$	1.43E-07
	Chloroform	0.9	ug/L	0.9	ug/L	M	7.151E-06	mg/kg-d	8.10E-02	$mg/kg-d^{-1}$	5.79E-07
	Benzene	0.6	ug/L	0.6	ug/L	M	4.767E-06	mg/kg-d	2.73E-02	$mg/kg-d^{-1}$	1.30E-07
	Methylene chloride	0.5	ug/L	0.5	ug/L	M	3.973E-06	mg/kg-d	1.60E-03	$mg/kg-d^{-1}$	6.36E-09
	(Total)										1.14E-06
										Total Hazard Index Across All Exposure Routes/Pathways	1.94E-06

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

N/A = Not Applicable

NC = Not carcinogenic.

TABLE 8.2.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
EVERGREEN MANOR SITE, ROSCOE, WINNEBAGO COUNTY, ILLINOIS

Scenario Timeframe:	Current/Future
Medium:	Groundwater
Exposure Medium:	Groundwater
Exposure Point:	Tap Water
Receptor Population:	Resident
Receptor Age:	Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion											
	Acetone	100	ug/L	100	ug/L	M	5.479E-04	mg/kg-d	NC	mg/kg-d^{-1}	–
	Trichloroethene	6	ug/L	6	ug/L	M	3.288E-05	mg/kg-d	1.10E-02	mg/kg-d^{-1}	3.62E-07
	Tetrachloroethene	9	ug/L	9	ug/L	M	4.932E-05	mg/kg-d	5.20E-02	mg/kg-d^{-1}	2.56E-06
	Chloroform	0.9	ug/L	0.9	ug/L	M	4.932E-06	mg/kg-d	6.10E-03	mg/kg-d^{-1}	3.01E-08
	Benzene	0.6	ug/L	0.6	ug/L	M	3.288E-06	mg/kg-d	5.50E-02	mg/kg-d^{-1}	1.81E-07
	Methylene chloride	0.5	ug/L	0.5	ug/L	M	2.740E-06	mg/kg-d	7.50E-03	mg/kg-d^{-1}	2.05E-08
	(Total)										3.16E-06
Dermal											
	Acetone	100	ug/L	100	ug/L	M	1.547E-06	mg/kg-d	NC	mg/kg-d^{-1}	–
	Trichloroethene	6	ug/L	6	ug/L	M	2.605E-06	mg/kg-d	1.10E-02	mg/kg-d^{-1}	2.87E-08
	Tetrachloroethene	9	ug/L	9	ug/L	M	1.172E-05	mg/kg-d	5.20E-02	mg/kg-d^{-1}	6.10E-07
	Chloroform	0.9	ug/L	0.9	ug/L	M	2.173E-07	mg/kg-d	6.10E-03	mg/kg-d^{-1}	1.33E-09
	Benzene	0.6	ug/L	0.6	ug/L	M	3.419E-07	mg/kg-d	5.50E-02	mg/kg-d^{-1}	1.88E-08
	Methylene chloride	0.5	ug/L	0.5	ug/L	M	6.105E-08	mg/kg-d	7.50E-03	mg/kg-d^{-1}	4.58E-10
	(Total)										6.59E-07
Inhalation											
	Acetone	100	ug/L	100	ug/L	M	2.384E-03	mg/kg-d	NC	mg/kg-d^{-1}	–
	Trichloroethene	6	ug/L	6	ug/L	M	1.430E-04	mg/kg-d	6.00E-03	mg/kg-d^{-1}	8.58E-07
	Tetrachloroethene	9	ug/L	9	ug/L	M	2.145E-04	mg/kg-d	2.00E-03	mg/kg-d^{-1}	4.29E-07
	Chloroform	0.9	ug/L	0.9	ug/L	M	2.145E-05	mg/kg-d	8.10E-02	mg/kg-d^{-1}	1.74E-06
	Benzene	0.6	ug/L	0.6	ug/L	M	1.430E-05	mg/kg-d	2.73E-02	mg/kg-d^{-1}	3.90E-07
	Methylene chloride	0.5	ug/L	0.5	ug/L	M	1.192E-05	mg/kg-d	1.60E-03	mg/kg-d^{-1}	1.91E-08
	(Total)										3.43E-06
										Total Hazard Index Across All Exposure Routes/Pathways	7.25E-06

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

N/A = Not Applicable
NC = Not carcinogenic.

TABLE 8.3.CT

CALCULATION OF CANCER RISKS

CENTRAL TENDENCY EXPOSURE

EVERGREEN MANOR SITE, ROSCOE, WINNEBAGO COUNTY, ILLINOIS

Scenario Timeframe:	Future
Medium:	Groundwater
Exposure Medium:	Groundwater
Exposure Point:	Tap Water
Receptor Population:	Commercial/Industrial
Receptor Age:	Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion											
	Acetone	100	ug/L	100	ug/L	M	8.806E-05	mg/kg-d	NC	$mg/kg-d^{-1}$	–
	Trichloroethene	6	ug/L	6	ug/L	M	5.284E-06	mg/kg-d	1.10E-02	$mg/kg-d^{-1}$	5.81E-08
	Tetrachloroethene	9	ug/L	9	ug/L	M	7.926E-06	mg/kg-d	5.20E-02	$mg/kg-d^{-1}$	4.12E-07
	Chloroform	0.9	ug/L	0.9	ug/L	M	7.926E-07	mg/kg-d	6.10E-03	$mg/kg-d^{-1}$	4.83E-09
	Benzene	0.6	ug/L	0.6	ug/L	M	5.284E-07	mg/kg-d	5.50E-02	$mg/kg-d^{-1}$	2.91E-08
	Methylene chloride	0.5	ug/L	0.5	ug/L	M	4.403E-07	mg/kg-d	7.50E-03	$mg/kg-d^{-1}$	3.30E-09
	(Total)										5.07E-07
Dermal											
	Acetone	100	ug/L	100	ug/L	M	2.438E-07	mg/kg-d	NC	$mg/kg-d^{-1}$	–
	Trichloroethene	6	ug/L	6	ug/L	M	4.106E-07	mg/kg-d	1.10E-02	$mg/kg-d^{-1}$	4.52E-09
	Tetrachloroethene	9	ug/L	9	ug/L	M	1.848E-06	mg/kg-d	5.20E-02	$mg/kg-d^{-1}$	9.61E-08
	Chloroform	0.9	ug/L	0.9	ug/L	M	3.426E-08	mg/kg-d	6.10E-03	$mg/kg-d^{-1}$	2.09E-10
	Benzene	0.6	ug/L	0.6	ug/L	M	5.389E-08	mg/kg-d	5.50E-02	$mg/kg-d^{-1}$	2.96E-09
	Methylene chloride	0.5	ug/L	0.5	ug/L	M	9.624E-09	mg/kg-d	7.50E-03	$mg/kg-d^{-1}$	7.22E-11
	(Total)										1.04E-07
Inhalation											
	Acetone	100	ug/L	100	ug/L	M	9.435E-04	mg/kg-d	NC	$mg/kg-d^{-1}$	–
	Trichloroethene	6	ug/L	6	ug/L	M	5.661E-05	mg/kg-d	6.00E-03	$mg/kg-d^{-1}$	3.40E-07
	Tetrachloroethene	9	ug/L	9	ug/L	M	8.492E-05	mg/kg-d	2.00E-03	$mg/kg-d^{-1}$	1.70E-07
	Chloroform	0.9	ug/L	0.9	ug/L	M	8.492E-06	mg/kg-d	8.10E-02	$mg/kg-d^{-1}$	6.88E-07
	Benzene	0.6	ug/L	0.6	ug/L	M	5.661E-06	mg/kg-d	2.73E-02	$mg/kg-d^{-1}$	1.55E-07
	Methylene chloride	0.5	ug/L	0.5	ug/L	M	4.718E-06	mg/kg-d	1.60E-03	$mg/kg-d^{-1}$	7.55E-09
	(Total)										1.36E-06
										Total Hazard Index Across All Exposure Routes/Pathways	1.97E-06

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

N/A = Not Applicable

NC = Not carcinogenic.

TABLE 8.3.RME

C/ .CULATION OF CANCER RISKS

RE/ SONABLE MAXIMUM EXPOSURE

EVERGREEN MANO SITE, ROSCOE, WINNEBAGO COUNTY, ILLINOIS

Scenario Timeframe:	Future
Medium:	Groundwater
Exposure Medium:	Groundwater
Exposure Point:	Tap Water
Receptor Population:	Commercial/Industrial
Receptor Age:	Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion											
	Acetone	100	ug/L	100	ug/L	M	3.495E-04	mg/kg-d	NC	$mg/kg-d^{-1}$	–
	Trichloroethene	6	ug/L	6	ug/L	M	2.097E-05	mg/kg-d	1.10E-02	$mg/kg-d^{-1}$	2.31E-07
	Tetrachloroethene	9	ug/L	9	ug/L	M	3.145E-05	mg/kg-d	5.20E-02	$mg/kg-d^{-1}$	1.64E-06
	Chloroform	0.9	ug/L	0.9	ug/L	M	3.145E-06	mg/kg-d	6.10E-03	$mg/kg-d^{-1}$	1.92E-08
	Benzene	0.6	ug/L	0.6	ug/L	M	2.097E-06	mg/kg-d	5.50E-02	$mg/kg-d^{-1}$	1.15E-07
	Methylene chloride	0.5	ug/L	0.5	ug/L	M	1.747E-06	mg/kg-d	7.50E-03	$mg/kg-d^{-1}$	1.31E-08
	(Total)										2.01E-06
Dermal											
	Acetone	100	ug/L	100	ug/L	M	2.657E-06	mg/kg-d	NC	$mg/kg-d^{-1}$	–
	Trichloroethene	6	ug/L	6	ug/L	M	4.475E-06	mg/kg-d	1.10E-02	$mg/kg-d^{-1}$	4.92E-08
	Tetrachloroethene	9	ug/L	9	ug/L	M	2.014E-05	mg/kg-d	5.20E-02	$mg/kg-d^{-1}$	1.05E-06
	Chloroform	0.9	ug/L	0.9	ug/L	M	3.734E-07	mg/kg-d	6.10E-03	$mg/kg-d^{-1}$	2.28E-09
	Benzene	0.6	ug/L	0.6	ug/L	M	5.874E-07	mg/kg-d	5.50E-02	$mg/kg-d^{-1}$	3.23E-08
	Methylene chloride	0.5	ug/L	0.5	ug/L	M	1.049E-07	mg/kg-d	7.50E-03	$mg/kg-d^{-1}$	7.87E-10
	(Total)										1.13E-06
Inhalation											
	Acetone	100	ug/L	100	ug/L	M	2.621E-03	mg/kg-d	NC	$mg/kg-d^{-1}$	–
	Trichloroethene	6	ug/L	6	ug/L	M	1.573E-04	mg/kg-d	6.00E-03	$mg/kg-d^{-1}$	9.44E-07
	Tetrachloroethene	9	ug/L	9	ug/L	M	2.359E-04	mg/kg-d	2.00E-03	$mg/kg-d^{-1}$	4.72E-07
	Chloroform	0.9	ug/L	0.9	ug/L	M	2.359E-05	mg/kg-d	8.10E-02	$mg/kg-d^{-1}$	1.91E-06
	Benzene	0.6	ug/L	0.6	ug/L	M	1.573E-05	mg/kg-d	2.73E-02	$mg/kg-d^{-1}$	4.29E-07
	Methylene chloride	0.5	ug/L	0.5	ug/L	M	1.310E-05	mg/kg-d	1.60E-03	$mg/kg-d^{-1}$	2.10E-08
	(Total)										3.78E-06
										Total Hazard Index Across All Exposure Routes/Pathways	6.92E-06

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

N/A = Not Applicable

NC = Not carcinogenic.

TABLE 9.1.CT

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

CENTRAL TENDENCY EXPOSURE

EVERGREEN MANOR SITE, ROSCOE, WINNEBAGO COUNTY, ILLINOIS

Scenario Timefram	Current/Future
Receptor Populatio	Resident
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Tap water	Acetone	--	--	--	0.0E+00	Acetone	liver/kidney	1.9E-02	1.0E-01	2.7E-05	1.2E-01
			Trichloroethene	1.3E-07	3.7E-0	4.9E-09	5.0E-07	Trichloroethene	--	1.9E-02	1.0E-01	7.5E-04	1.2E-01
			Tetrachloroethene	9.0E-07	1.8E-0	1.0E-07	1.2E-06	Tetrachloroethene	liver	1.7E-02	8.4E-03	2.0E-03	2.8E-02
			Chloroform	1.1E-08	7.5E-0	2.3E-10	7.6E-07	Chloroform	liver	1.7E-03	1.1E+00	3.7E-05	1.1E+00
			Benzene	6.3E-08	1.7E-0	3.2E-09	2.3E-07	Benzene	--	3.8E-03	3.6E-02	2.0E-04	4.0E-02
			Methylene chloride	7.2E-09	8.2E-0	7.9E-11	1.5E-08	Methylene chloride	liver	1.6E-04	6.0E-05	1.7E-06	2.2E-04
			(Total)	1.1E-08	1.5E-0	1.1E-07	2.7E-06	(Total)		6.1E-02	1.3E+00	3.0E-03	1.4E+00
						Total Risk Acro s [Groundwater]	2.7E-06					Total Hazard Index Across All Media and All Exposure Routes	1.4E+00
						Total Risk Across All Media and All Exposure Routes	2.7E-06					Total [liver] HI =	1.2E+00

NA = Not applicable.

TABLE 9.1.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

EVERGREEN MANOR SITE, ROSCOE, WINNEBAGO COUNTY, ILLINOIS

Scenario Timefram	Current/Future
Receptor Populatio	Resident
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Tap water	Acetone	--	--	--	--	Acetone	liver/kidney	2.7E-02	1.0E-01	1.0E-04	1.3E-01
			Trichloroethene	6.2E-07	1.3E-[illegible]	6.6E-08	2.0E-06	Trichloroethene	--	2.7E-02	1.0E-01	2.9E-03	1.3E-01
			Tetrachloroethene	4.4E-06	6.3E-[illegible]	1.4E-06	6.4E-06	Tetrachloroethene	liver	2.5E-02	8.4E-03	7.9E-03	4.1E-02
			Chloroform	5.2E-08	2.6E-[illegible]	3.1E-09	2.6E-08	Chloroform	liver	2.5E-03	1.1E+00	1.5E-04	1.1E+00
			Benzene	3.1E-07	5.8E-[illegible]	4.3E-08	9.3E-07	Benzene	--	5.5E-03	3.6E-02	7.7E-04	4.3E-02
			Methylene chloride	3.5E-08	2.8E-[illegible]	1.1E-09	6.4E-08	Methylene chloride	liver	2.3E-04	6.0E-05	6.9E-06	2.9E-04
			(Total)	5.4E-06	5.1E-[illegible]	1.5E-06	1.2E-05	(Total)		8.8E-02	1.3E+00	1.2E-02	1.4E+00
						Total Risk Acr[illegible]s[Groundwater]	1.2E-05					Total Hazard Index Across All Media and All Exposure Routes	1.4E+00
						Total Risk Across All Media and All [illegible]xposure Routes	1.2E-05					Total [liver] HI =	1.2E+00

NA = Not applicable.

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TABLE 9.2.CT

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

CENTRAL TENDENCY EXPOSURE

EVERGREEN MANOR SITE, ROSCOE, WINNEBAGO COUNTY, ILLINOIS

Scenario Timefram	Current/Future
Receptor Populatio	Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Tap water	Acetone	–	–	–	0.0E+00	Acetone	liver/kidney	4.5E-02	2.8E-01	4.5E-05	3.2E-01
			Trichloroethene	8.4E-08	2.9E-07	2.4E-09	3.7E-07	Trichloroethene	–	4.5E-02	2.8E-01	1.3E-03	3.2E-01
			Tetrachloroethene	6.0E-07	1.4E-0	5.1E-08	7.9E-07	Tetrachloroethene	liver	4.0E-02	2.3E-02	3.4E-03	6.6E-02
			Chloroform	7.0E-09	5.8E-0	1.1E-10	5.9E-07	Chloroform	liver	4.0E-03	2.9E+00	6.4E-05	2.9E+00
			Benzene	4.2E-08	1.3E-0	1.6E-09	1.7E-07	Benzene	–	8.9E-03	9.8E-02	3.3E-04	1.1E-01
			Methylene chloride	4.8E-09	6.4E-0	3.8E-11	1.1E-08	Methylene chloride	liver	3.7E-04	1.6E-04	3.0E-06	5.4E-04
			(Total)	7.4E-07	1.1E-0	5.8E-08	1.9E-06	(Total)		1.4E-01	3.6E+00	5.2E-03	3.7E+00
						Total Risk Acro: [Groundwater]	1.9E-06					Total Hazard Index Across All Media and All Exposure Routes	3.7E+00
						Total Risk Across All Media and All Exposure Routes	1.9E-06					Total [liver] HI =	3.3E+00

NA = Not applicable.

TABLE 9.2.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

EVERGREEN MANOR SITE, ROSCOE, WINNEBAGO COUNTY, ILLINOIS

Scenario Timefram	Current/Future
Receptor Populatio	Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Tap water	Acetone	–	–	–	0.0E+00	Acetone	liver/kidney	6.4E-02	2.8E-01	1.8E-04	3.4E-01
			Trichloroethene	3.6E-07	8.6E-0	2.9E-08	1.2E-06	Trichloroethene	–	6.4E-02	2.8E-01	5.1E-03	3.5E-01
			Tetrachloroethene	2.6E-06	4.3E-0	6.1E-07	3.6E-06	Tetrachloroethene	liver	5.8E-02	2.3E-02	1.4E-02	9.4E-02
			Chloroform	3.0E-08	1.7E-0	1.3E-09	1.8E-06	Chloroform	liver	5.8E-03	2.9E+00	2.5E-04	2.9E+00
			Benzene	1.8E-07	3.9E-0	1.9E-08	5.9E-07	Benzene	–	1.3E-02	9.8E-02	1.3E-03	1.1E-01
			Methylene chloride	2.1E-08	1.9E-0	4.6E-10	4.0E-08	Methylene chloride	liver	5.3E-04	1.6E-04	1.2E-05	7.1E-04
			(Total)	3.2E-06	3.4E-0	6.6E-07	7.3E-06	(Total)		2.0E-01	3.6E+00	2.1E-02	3.8E+00
						Total Risk Acros[Groundwater]	7.3E-06					Total Hazard Index Across All Media and All Exposure Routes	3.8E+00
						Total Risk Across All Media and All xposure Routes	7.3E-06					Total [liver) HI =	3.4E+00

NA = Not applicable.

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TABLE 9.3.CT

SUMMARY OF R ECEPTOR RISKS AND HAZARDS FOR COPCs

C NTRAL TENDENCY EXPOSURE

EVERGREEN MANO R SITE, ROSCOE, WINNEBAGO COUNTY, ILLINOIS

Scenario Timeframe:	Future
Receptor Population:	Commercial/Industrial
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Tap water	Acetone	--	--	--	0.0E+00	Acetone	liver/kidney	6.8E-03	7.3E-02	1.9E-05	8.0E-02
			Trichloroethene	5.8E-08	3.4E-07	4.5E-09	4.0E-07	Trichloroethene	--	6.8E-03	7.3E-02	5.3E-04	8.1E-02
			Tetrachloroethene	4.1E-07	1.7E-07	9.6E-08	6.8E-07	Tetrachloroethene	liver	6.2E-03	6.0E-03	1.4E-03	1.4E-02
			Chloroform	4.8E-09	6.9E-07	2.1E-10	6.9E-07	Chloroform	liver	6.2E-04	7.7E-01	2.7E-05	7.7E-01
			Benzene	2.9E-08	1.5E-07	3.0E-09	1.9E-07	Benzene	--	1.4E-03	2.6E-02	1.4E-04	2.7E-02
			Methylene chloride	3.3E-09	7.5E-09	7.2E-11	1.1E-08	Methylene chloride	liver	5.7E-05	4.3E-05	1.2E-06	1.0E-04
			(Total)	5.1E-07	1.4E-06	1.0E-07	2.0E-06	(Total)		2.2E-02	9.5E-01	2.2E-03	9.7E-01
							Total Risk A ross[Groundwater]	2.0E-06					Total Hazard Index Across All Media and All Exposure Routes	9.7E-01
							Total Risk Across All Media and I Exposure Routes	2.0E-06					Total [liver] HI =	8.6E-01

N/A = Not applicable.

TABLE 9.3.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

EVERGREEN MANOR SITE, ROSCOE, WINNEBAGO COUNTY, ILLINOIS

Scenario Timeframe:	Future
Receptor Population:	Commercial/Industrial
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Tap water	Acetone	--	--	--	--	Acetone	liver/kidney	9.8E-03	7.3E-02	7.4E-05	8.3E-02
			Trichloroethene	2.3E-07	4E-07	4.9E-08	1.2E-06	Trichloroethene	--	9.8E-03	7.3E-02	2.1E-03	8.5E-02
			Tetrachloroethene	1.6E-06	7E-07	1.0E-06	3.2E-06	Tetrachloroethene	liver	8.8E-03	6.0E-03	5.6E-03	2.0E-02
			Chloroform	1.9E-08	9E-08	2.3E-09	1.9E-06	Chloroform	liver	8.8E-04	7.7E-01	1.0E-04	7.7E-01
			Benzene	1.2E-07	3E-07	3.2E-08	5.8E-07	Benzene	--	2.0E-03	2.6E-02	5.5E-04	2.8E-02
			Methylene chloride	1.3E-08	1E-08	7.9E-10	3.5E-08	Methylene chloride	liver	8.2E-05	4.3E-05	4.9E-06	1.3E-04
			(Total)	2.0E-06	8E-06	1.1E-06	6.9E-06	(Total)		3.1E-02	9.5E-01	8.5E-03	9.9E-01
						Total Risk Across [Groundwater]	6.9E-06					Total Hazard Index Across All Media and All Exposure Routes	9.9E-01
						Total Risk Across All Media and All Exposure Routes	6.9E-06					Total [liver] HI =	8.7E-01

N/A = Not applicable.

TABLE 10.1.CT

SUMMARY OF R ECEPTOR RISKS AND HAZARDS FOR COPCs

CE NTRAL TENDENCY EXPOSURE

EVERGREEN MANO SITE, ROSCOE, WINNEBAGO COUNTY, ILLINOIS

Scenario Timefram	Current/Future
Receptor Populatio	Resident
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Tap water	Acetone	--	--	--	0.0E+00	Acetone	liver/kidney	1.9E-02	1.0E-01	2.7E-05	1.2E-01
			Trichloroethene	1.3E-07	3.7E-0	4.9E-09	5.0E-07	Trichloroethene	--	--	--	--	--
			Tetrachloroethene	9.0E-07	1.8E-0	1.0E-07	1.2E-06	Tetrachloroethene	liver	1.7E-02	8.4E-03	2.0E-03	2.8E-02
			Chloroform	1.1E-08	7.5E-0	2.3E-10	7.6E-07	Chloroform	liver	1.7E-03	1.1E+00	3.7E-05	1.1E+00
			Benzene	6.3E-08	1.7E-0	3.2E-09	2.3E-07	Benzene	--	--	--	--	--
			Methylene chloride	7.2E-09	8.2E-0	7.9E-11	1.5E-08	Methylene chloride	liver	1.6E-04	6.0E-05	1.7E-06	2.2E-04
			(Total)	1.1E-06	1.5E-0	1.1E-07	2.7E-06	(Total)		3.8E-02	1.2E+00	2.1E-03	1.2E+00
						Total Risk Acro s [Groundwater]	2.7E-06					Total Hazard Index Across All Media and All Exposure Routes	1.2E+00
						Total Risk Across All Media and All Exposure Routes	2.7E-06					Total [liver] HI =	1.2E+00

NA = Not applicable.

TABLE 10.1.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

EVERGREEN MANOR SITE, ROSCOE, WINNEBAGO COUNTY, ILLINOIS

Scenario Timefram	Current/Future
Receptor Populatio	Resident
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Tap water	Acetone	--	--	--	--	Acetone	liver/kidney	2.7E-02	1.0E-01	1.0E-04	1.3E-01
			Trichloroethene	6.2E-07	1.3E-[illegible]	6.6E-08	2.0E-06	Trichloroethene	--	--	--	--	--
			Tetrachloroethene	4.4E-06	6.3E-[illegible]	1.4E-06	6.4E-06	Tetrachloroethene	liver	2.5E-02	8.4E-03	7.9E-03	4.1E-02
			Chloroform	5.2E-08	2.6E-[illegible]	3.1E-09	2.6E-06	Chloroform	liver	2.5E-03	1.1E+00	1.5E-04	1.1E+00
			Benzene	3.1E-07	5.8E-[illegible]	4.3E-08	9.3E-07	Benzene	--	--	--	--	--
			Methylene chloride	3.5E-08	2.8E-[illegible]	1.1E-09	6.4E-08	Methylene chloride	liver	2.3E-04	6.0E-05	6.9E-06	2.9E-04
			(Total)	5.4E-06	5.1E-[illegible]	1.5E-06	1.2E-05	(Total)		5.5E-02	1.2E+00	8.2E-03	1.2E+00
							Total Risk Acro[illegible]s[Groundwater]	1.2E-05					Total Hazard Index Across All Media and All Exposure Routes	1.2E+00
							Total Risk Across All Media and All [illegible]xposure Routes	1.2E-05					Total [liver) HI =	1.2E+00

NA = Not applicable.

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TABLE 10.2.CT

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

CENTRAL TENDENCY EXPOSURE

EVERGREEN MANOR SITE, ROSCOE, WINNEBAGO COUNTY, ILLINOIS

Scenario Timefram	Current/Future
Receptor Populatio	Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Tap water	Acetone	--	--	--	0.0E+00	Acetone	liver/kidney	4.5E-02	2.6E-01	4.5E-05	3.2E-01
			Trichloroethene	8.4E-08	2.9E-07	2.4E-09	3.7E-07	Trichloroethene	--	--	--	--	--
			Tetrachloroethene	6.0E-07	1.4E-07	5.1E-08	7.9E-07	Tetrachloroethene	liver	4.0E-02	2.3E-02	3.4E-03	6.6E-02
			Chloroform	7.0E-09	5.8E-07	1.1E-10	5.9E-07	Chloroform	liver	4.0E-03	2.9E+00	6.4E-05	2.9E+00
			Benzene	4.2E-08	1.3E-07	1.6E-09	1.7E-07	Benzene	--	--	--	--	--
			Methylene chloride	4.8E-09	6.4E-08	3.8E-11	1.1E-08	Methylene chloride	liver	3.7E-04	1.6E-04	3.0E-06	5.4E-04
			(Total)	7.4E-07	1.1E-06	5.6E-08	1.9E-06	(Total)		8.9E-02	3.2E+00	3.5E-03	3.3E+00
						Total Risk Across All Media and All Exposure Routes[Groundwater]	1.9E-06					Total Hazard Index Across All Media and All Exposure Routes	3.3E+00
						Total Risk Across All Media and All Exposure Routes	1.9E-06					Total [liver] HI =	3.3E+00

NA = Not applicable.

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TABLE 10.2.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

EVERGREEN MANOR SITE, ROSCOE, WINNEBAGO COUNTY, ILLINOIS

Scenario Timefram	Current/Future
Receptor Populatio	Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Tap water	Acetone	–	–	–	0.0E+00	Acetone	liver/kidney	6.4E-02	2.8E-01	1.8E-04	3.4E-01
			Trichloroethene	3.6E-07	8.6E-0	2.9E-08	1.2E-06	Trichloroethene	–	–	–	–	–
			Tetrachloroethene	2.6E-06	4.3E-0	6.1E-07	3.6E-06	Tetrachloroethene	liver	5.8E-02	2.3E-02	1.4E-02	9.4E-02
			Chloroform	3.0E-08	1.7E-0	1.3E-09	1.8E-06	Chloroform	liver	5.8E-03	2.9E+00	2.5E-04	2.9E+00
			Benzene	1.8E-07	3.9E-0	1.9E-08	5.9E-07	Benzene	–	–	–	–	–
			Methylene chloride	2.1E-08	1.9E-0	4.6E-10	4.0E-08	Methylene chloride	liver	5.3E-04	1.6E-04	1.2E-05	7.1E-04
			(Total)	3.2E-06	3.4E-0	6.6E-07	7.3E-06	(Total)		1.3E-01	3.2E+00	1.4E-02	3.4E+00
						Total Risk Acro s[Groundwater]	7.3E-06					Total Hazard Index Across All Media and All Exposure Routes	3.4E+00
						Total Risk Across All Media and All xposure Routes	7.3E-06					Total (liver) HI =	3.4E+00

NA = Not applicable.

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TABLE 10.3.CT

SUMMARY OF R ECEPTOR RISKS AND HAZARDS FOR COPCs

CE NTRAL TENDENCY EXPOSURE

EVERGREEN MANO SITE, ROSCOE, WINNEBAGO COUNTY, ILLINOIS

Scenario Timeframe:	Future
Receptor Population:	Commercial/Industrial
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Tap water	Acetone	--	--	--	0.0E+00	Acetone	liver/kidney	--	--	--	--
			Trichloroethene	5.8E-08	3.4E-07	4.5E-09	4.0E-07	Trichloroethene	--	--	--	--	--
			Tetrachloroethene	4.1E-07	2.7E-07	9.6E-08	6.8E-07	Tetrachloroethene	liver	--	--	--	--
			Chloroform	4.8E-09	6.9E-07	2.1E-10	6.9E-07	Chloroform	liver	--	--	--	--
			Benzene	2.9E-08	1.5E-07	3.0E-09	1.9E-07	Benzene	--	--	--	--	--
			Methylene chloride	3.3E-09	7.5E-09	7.2E-11	1.1E-08	Methylene chloride	liver	--	--	--	--
			(Total)	5.1E-07	1.4E-06	1.0E-07	2.0E-06	(Total)		--	--	--	--
						Total Risk A ross[Groundwater]	2.0E-06					Total Hazard Index Across All Media and All Exposure Routes	--
						Total Risk Across All Media and l Exposure Routes	2.0E-06					Total [liver) HI =	--

N/A = Not applicable.

RFW036-2A-AHV

RFW036-2A-AGQP

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TABLE 10.3.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

EVERGREEN MANOR SITE, ROSCOE, WINNEBAGO COUNTY, ILLINOIS

Scenario Timeframe:	Future
Receptor Population:	Commercial/Industrial
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Tap water	Acetone	--	--	--	--	Acetone	liver/kidney	--	--	--	--
			Trichloroethene	2.3E-07	4E-07	4.9E-08	1.2E-06	Trichloroethene	--	--	--	--	--
			Tetrachloroethene	1.6E-06	7E-07	1.0E-06	3.2E-06	Tetrachloroethene	liver	--	--	--	--
			Chloroform	1.9E-08	9E-08	2.3E-09	1.9E-06	Chloroform	liver	--	--	--	--
			Benzene	1.2E-07	3E-07	3.2E-08	5.8E-07	Benzene	--	--	--	--	--
			Methylene chloride	1.3E-08	1E-08	7.9E-10	3.5E-08	Methylene chloride	liver	--	--	--	--
			(Total)	2.0E-06	8E-08	1.1E-06	6.9E-06	(Total)		--	--	--	--
						Total Risk Across[Groundwater]	6.9E-06					Total Hazard Index Across All Media and All Exposure Routes	--
						Total Risk Across All Media and All Exposure Routes	6.9E-06					Total (liver) HI =	--

N/A = Not applicable.

APPENDIX B

FRACTURE TRACE ANALYSIS, RESOLUTION RESOURCES, INC.

LETTER REPORT

FRACTURE TRACE ANALYSIS

at the

EVERGREEN MANOR SITE
Winnebago County, Illinois

Submitted to:

ROY F. WESTON, INC.
3 Hawthorne Parkway, Suite 400
Vernon Hills, Illinois 60061
Mr. Kurt T. Fischer
Tel: 847-918-4016 • Fax: 847-918-4055

Submitted by:

Resolution Resources, Jnc.

Brian B. Herridge
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Minneapolis, MN 55419
612-824-3234

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8167 Old Waterloo Road
Warrenton, VA 22186
540-349-9176

May 4, 2000

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LIST OF TABLES, FIGURES & APPENDICES

1. PROJECT OVERVIEW

1.1 INTRODUCTION

Resolution Resources, Inc. (RRI) performed a fracture trace analysis on aerial photographs of the Evergreen Manor Site, located in Winnebago County, Illinois. **Figure 1** shows the site on the South Beloit, Illinois-Wisconsin topographic map (USGS, 1993). The site area is located southeast of Rockton in the relatively flat lying valley of the Rock River. The site includes four residential subdivisions that were developed from 1940 to 1988 on farmland. It is bounded by the Rock River to the south and surrounded by forest and farmland. EPA sampling results from 1993 and 1994 indicated that TCA and TCE had impacted over 60 residential wells. It has been estimated that contaminants have affected 700 people in 250 residences.

1.2 OBJECTIVES

The objectives of the photographic interpretation at the Evergreen Manor site were to help select representative groundwater sample locations, and to further evaluate the suspected source areas and the extent of the VOC plume. This information will be used to focus the investigation and to help evaluate the remedial alternatives at the site. The final report includes a series of suggested sample points to better define the plume. These points have been plotted on the aerial photographs. A discussion for the location of each point has been included in the report.

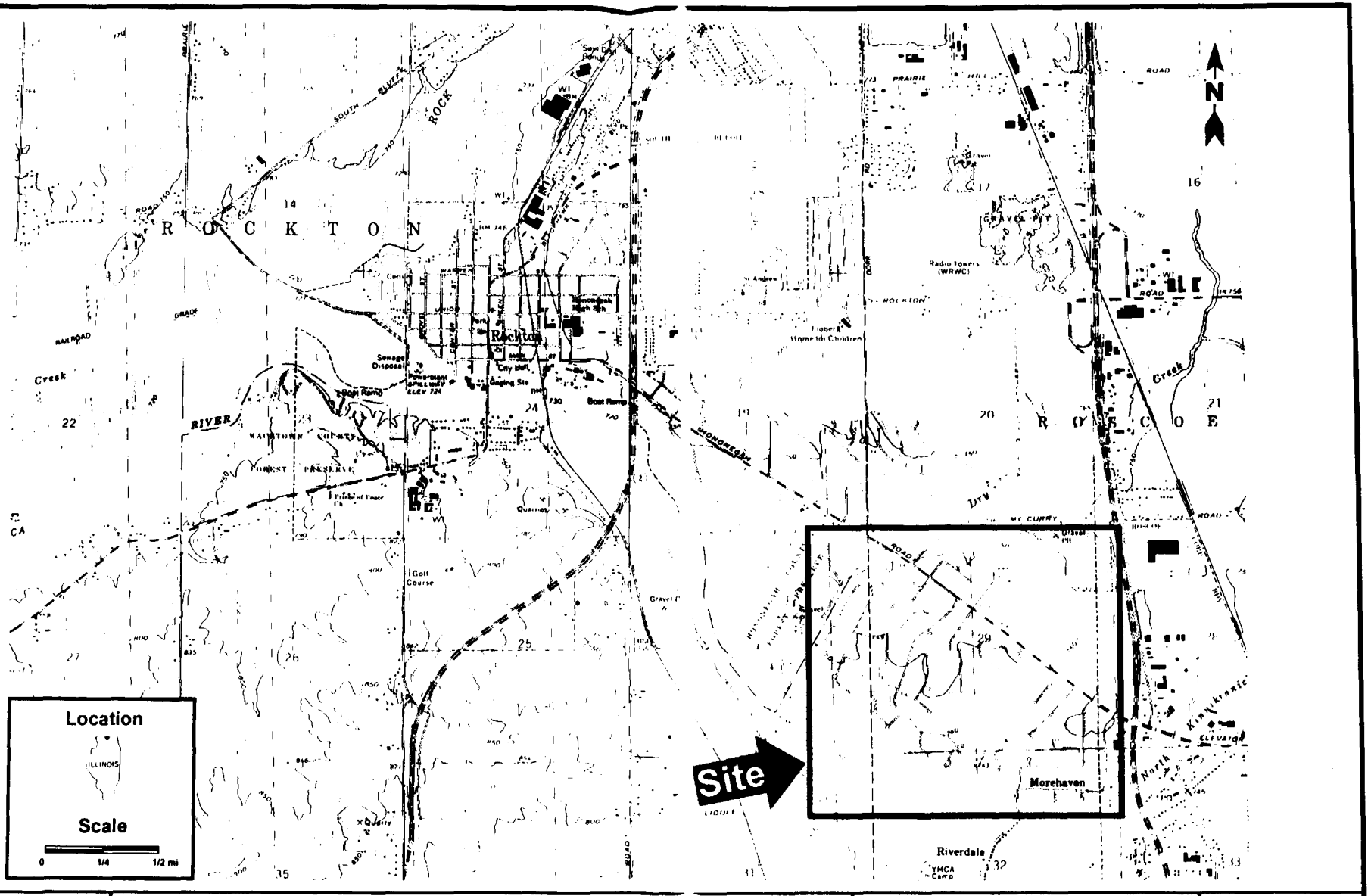
1.3 WORK TASKS

In order to meet the objectives of the work, the following tasks were performed:

Task 1 Background Review
Task 2 Photographic Interpretation
Task 3 Report

1.3.1 BACKGROUND REVIEW

This task included reviewing available background information on the site history, contaminant distribution, geology, and hydrogeology, which was provided by Roy F. Weston, Inc. The task also included performing a search for and the selection of the most appropriate historical aerial photographs.



310 West 52nd Street Minneapolis, MN 55419 Tel (612) 824-3234 Fax (612) 825-0705	Title Topographic Map	Reference after USGS (1993)	Figure No. 1

1.3.2 PHOTOGRAPHIC INTERPRETATION

This task consisted of reviewing available aerial photographs and then performing a stereographic interpretation. Selected photographs were evaluated using a Topcon viewer. Historical photographs were also reviewed to better discuss possible source locations.

1.3.3 REPORT

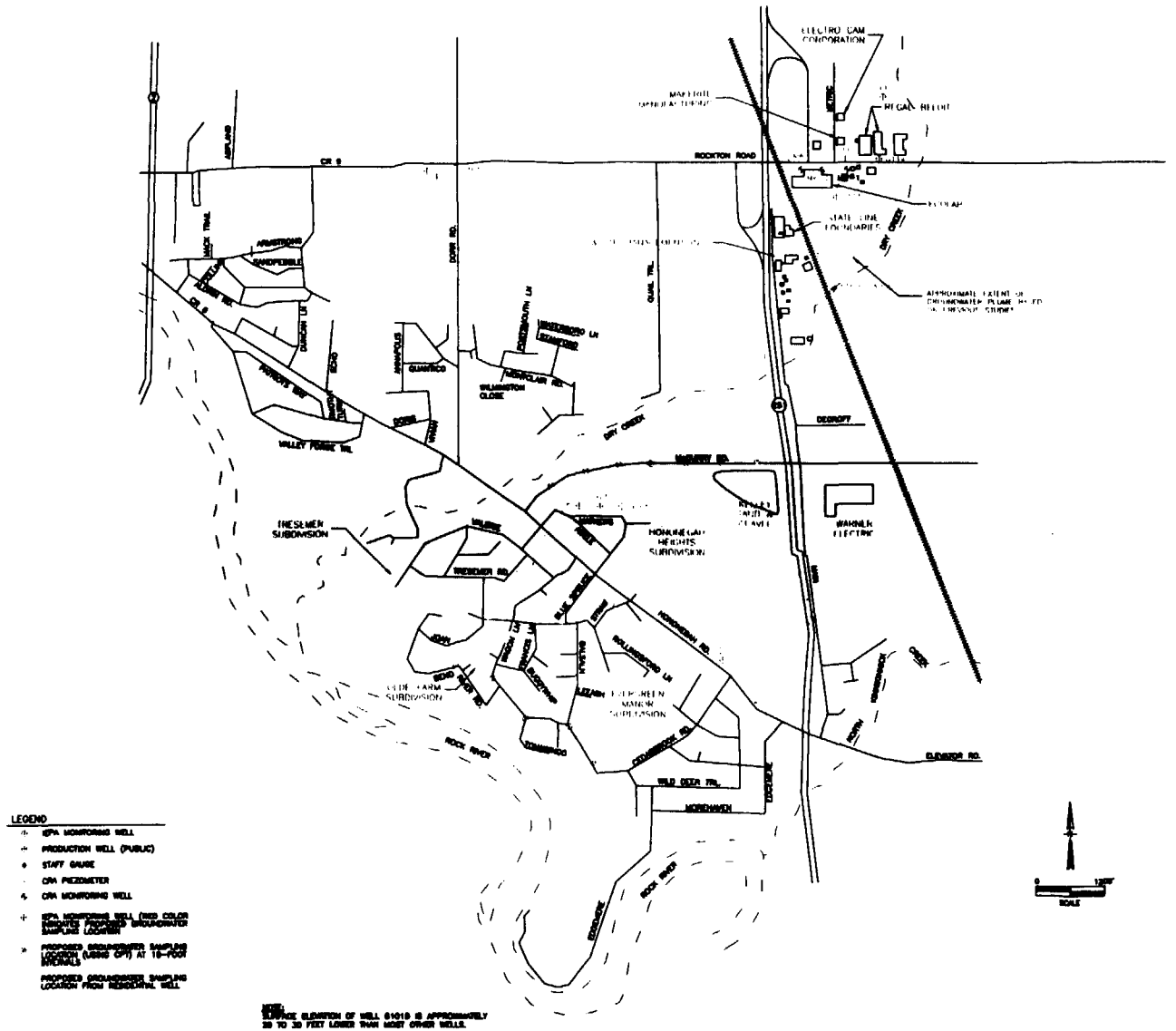
This letter report summarizes all activities that were performed on the project. A hard copy of the photographic interpretation has been included, along with recommendations for the location of sample points.

2. BACKGROUND INFORMATION

2.1 LOCATION AND HISTORY

The Evergreen Manor site is located in Winnebago County, Illinois about 1.5 miles northwest of Roscoe. The site has been defined by the extent of a solvent plume in groundwater. It includes four residential subdivisions, as shown on **Figure 2**: Hononegah Heights, developed between 1940 and 1964; Tresemer, developed between 1972 and 1974; Olde Farm, developed between 1976 and 1979; and Evergreen Manor, developed between 1986 and 1988. Hononegah Country Estates subdivision, which is characterized by a separate contaminant plume, is located further to the southeast. Prior to development the land was farmed. As shown on the topographic map (Figure 1), the site is bounded to the south by the Rock River, by the Hononegah Forest Preserve to the west, and farmland to the east and north. Kelly Sand and Gravel, a gravel pit and concrete mixing facility, is located about ½ mile northeast of the site. Further to the northeast, about two miles, is an industrial park.

The presence of VOCs in the groundwater at Evergreen Manor was first detected in the 1990's as a result of requirements of a lending institution. Further sampling showed that a VOC plume consisting of TCE; 1,1 DCE; C-1,2 DCE; 1,1 DCA; TCA; 1,12 TCA; and PCE existed beneath Hononegah Heights and Evergreen Manor. The site was added to CERCLIS in 1991, and a Preliminary Assessment (PA) was performed in 1992. A Sampling Site Inspection (SSI) was performed in 1992 to gather further information for the Hazard Ranking System (HRS). Soil gas and groundwater samples were collected. No contaminants were found north of Rockton Road. VOCs were detected in a well north of the Waste Management facility (Figure 2).



Kennedy Resources, Inc. 10 Resources Keeping for the Environment	310 West 82nd Street Minneapolis, MN 55419 Tel (612) 824-3234 Fax (612) 825-0705	Title: Site Plan, Sampling Locations, & VOC Plume	Reference: after Roy F. Weston (2000)	Figure No: 2

Based on the previous results, an Expanded Site Inspection (ESI) was conducted in 1993, which consisted of the collection of 49 water samples from 45 residential wells in the Hononegah Heights, Olde Farm and Evergreen Manor Subdivisions. By 1994 a total of 267 drinking water wells were sampled, with 108 wells above the MCL and 203 that showed VOCs. A total of 24 monitor wells have also been installed and tested. The source area has been determined to be located near the intersection of Rockton Road and Route 251. Four PRPs have been identified and have declined to participate in the remedial effort (Weston, 1999).

2.2 SITE GEOLOGY & HYDROLOGY

The site is located within the preglacial Rock River Valley, which is a bedrock valley that has been infilled with Quaternary glacial deposits. Highly permeable sand and gravel are the principal sediments. These deposits can reach thickness' of up to 300 feet. Logs from the wells drilled at the site, as deep as 100 feet, are characterized by sand and gravel deposits. The Rock River has eroded into Ordovician and Cambrian clastic and carbonate rocks, which were deposited on Precambrian granite.

The aquifers beneath the site consist of the glacial outwash sand and gravel and the St. Peter, Ironton-Galesville, and Mt. Simon Formation sandstones. Most of the domestic wells are drilled in the glacial deposits, from 50 to 80 feet, while larger municipal wells extend into the sandstone. The water table is about 35 feet below ground surface (bgs). The dolomite (carbonate) acts as an aquitard. Groundwater flow in the dolomite is through vertical fractures. Although the yields are not as high as in the glacial deposits or the sandstone some water wells have been drilled within the dolomite.

3. PHOTOGRAPHIC ANALYSIS

Aerial photography and satellite imagery can often provide very useful information on site history, including contaminant source area location, site development over time, regional topography, possible impacts to the local watershed, changes in surrounding commercial development, possible offsite contaminant sources and other influences and effects such as stressed vegetation. More importantly, stereographic photographs are an invaluable tool for the identification of geologic structural features such as fractures, faults and relative highs and lows (structural/topographic).

A library search was made to identify the years and scales of photographs that were available for the site. **Table 1** lists all the photographs that are available. **Table 2** references the date and scale for each photograph that was ordered and reviewed. Stereographic pairs of aerial photographs of the Evergreen Manor Site were examined for suitability to perform a fracture trace analysis.

TABLE 1: AVAILABLE AERIAL PHOTOGRAPHS OF THE SITE

Flight Year	Scale
1939	1" = 1667'
1945	1" = 2257'
1946	1" = 2267'
1951-53	1" = 1667'
1958	1" = 1667', 1" = 5500'
1964	1" = 1667'
1966	1" = 1000'
1970	1" = 1667', 1" = 1700', 1" = 3166'
1975	1" = 3167'
1976	1" = 3000'
1978	1" = 900', 1" = 2000'
1979	1" = 3300'
1980-81	1" = 4800', 1" = 6700'
1981	1" = 1000'
1986-88	1" = 1000', 1" = 3300', 1" = 3333', 1" = 4800', 1" = 5700'
1988	1" = 3300'
1991	1" = 2083'
1992-93	1" = 3300'
1994	1" = 1000'

TABLE 2: EXAMINED AERIAL PHOTOGRAPHS

Flight Year	Scale	Number
1939	1" = 1667'	4-25, 4-26, 4-38, 4-39
1946	1" = 2267'	852 - 854, 861 - 863
1970	1" = 1700'	2-150, 2-151, 2-152, 2-160, 2-161, 2-162
1978	1" = 900'	2-1-1 to 2-1-5, 1-4-1 to 1-4-2
1994	1" = 3600'	5775-92, 5775-93, 5775-94

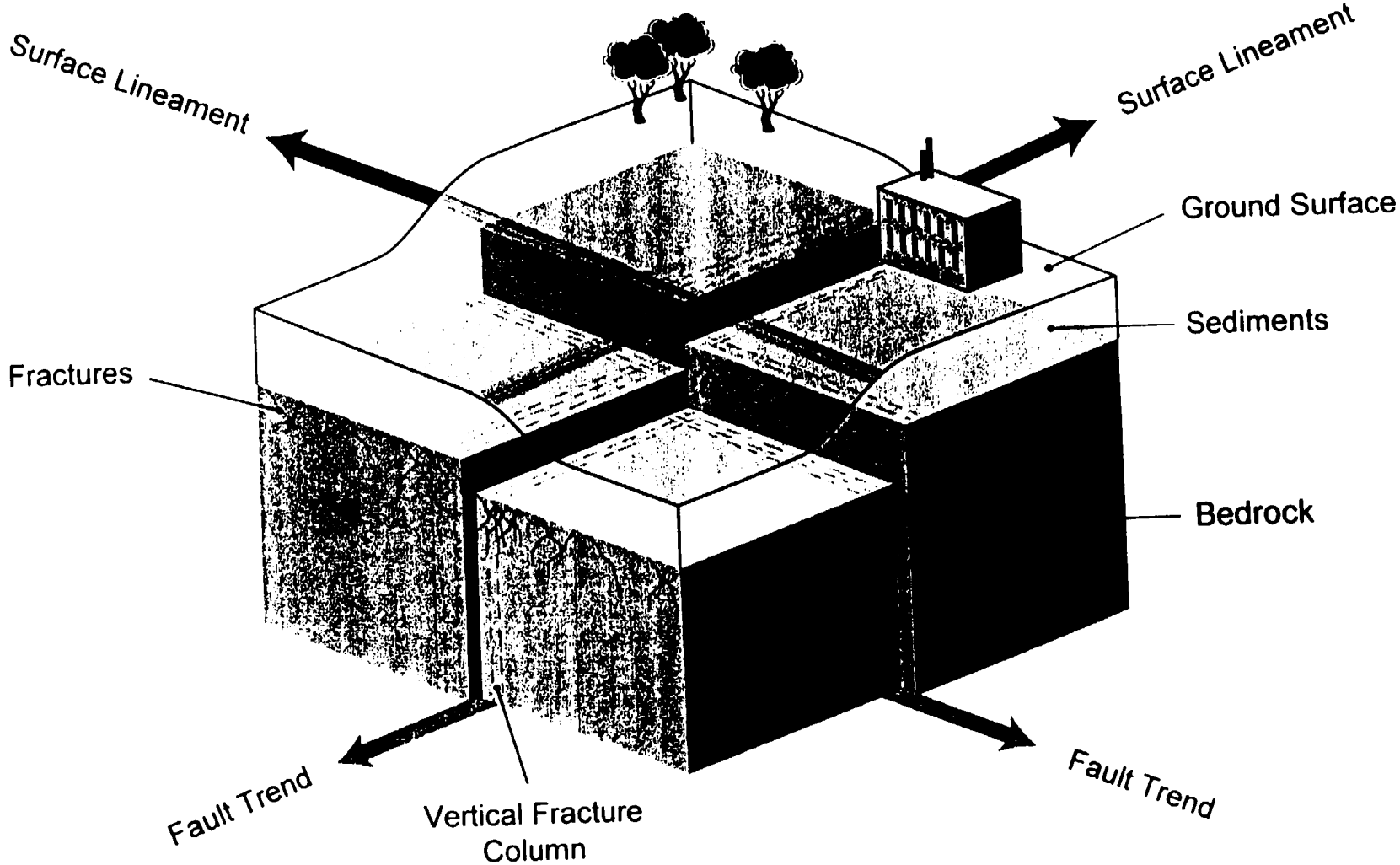
3.1 LINEAMENTS

It is often the case that fractures and faults in bedrock or basement rock are propagated up through unconsolidated sediments to the surface as failure planes. This may be a result of occasional seismic activity and water movement along the fracture. The surface features caused by the fractures are called lineaments. Lineaments show subtle surface expressions that reveal their subsurface existence and can often be seen in aerial photographs. Lineaments are identified primarily based upon subtle changes in the shading and in the topography at the ground surface. Lineaments cut across different surface terrain and often display a topographic expression where one side of the lineament is slightly higher than the other side, as though offset has occurred. Materials that infill faults or fractures frequently have a different shading than the surrounding surfaces which have never been fractured.

Investigators (Culbreth, 1988; Wobber, 1967; Parizek, 1977; Rumsey, 1971) have found that lineaments can be identified in aerial photographs, even when sediments overlie the bedrock for hundreds of feet, and that they are manifestations of fractures or faults that have been propagated from bedrock to the surface through unconsolidated sediments and soil. The lineaments can be expressed by a variety of features (Hough, 1960), such as tonal changes in soil, changes in the directions of streams, straight segments in drainage patterns, or alignment of vegetation (since fractures are often more permeable, more water is available for enhanced growth of the plants). As a result of their work on LandSat imagery, compared to outcrop patterns and geophysical data in Montana and Wyoming, Marrs and Rains (1984) concluded that the lineaments represented the surface expression of boundaries of crustal blocks that have been activated throughout time.

Figure 3 shows a schematic diagram of how vertical fractures in the bedrock can propagate upward, and are expressed as surface lineaments. Since the major fracture systems have often been active through time (occasional reactivation), the sediments above bedrock have failure planes that are localized zones of weakness along which channels may cut. This explains why channels below the ground surface, but above the bedrock, can often be identified through the careful analysis of lineaments.

Fractures can have an effect on a variety of site characteristics including groundwater flow, contaminant transport, and well yield. **Figure 4** schematically shows how the juncture of two vertical fractures can provide the optimum position for a vertical well screen, and if in connection with the source, for contaminant recovery. The vertical fractured column, created at the intersection of two vertical fracture sets, is connected to the other sub-vertical and horizontal fractures in the subsurface, making it the ideal location for a vertical well screen. Identifying fracture sets is very important to developing accurate site assessments and in designing effective remedial systems.

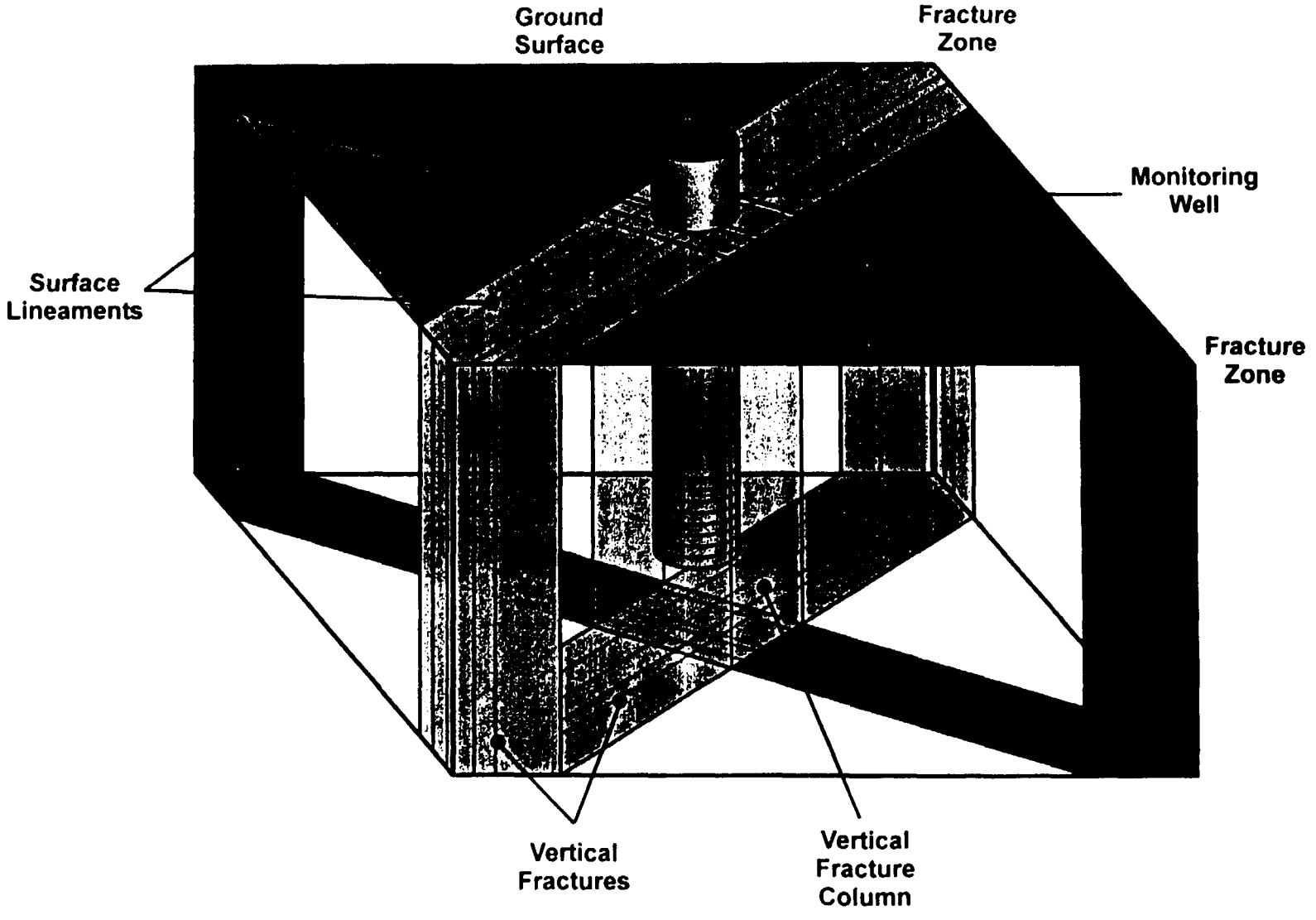


Resolution Resources, Inc.
3D Acoustic Imaging for the Environment
310 West 52nd Street
Minneapolis, MN 55419
Tel: (612) 824-3234
Fax: (612) 825-0705

Title: Fault B..cks and Lineaments Schematic (

Reference

Figure No: 3



Resolution Resources, Inc. 3D Acoustic Imaging for the Environment 310 West 52nd Street Minneapolis, MN 55419 Tel: (612) 824-3234 Fax: (612) 825-0705	Title Fractured Column Schematic	Reference	Figure No 4

3.2 HISTORICAL ANALYSIS

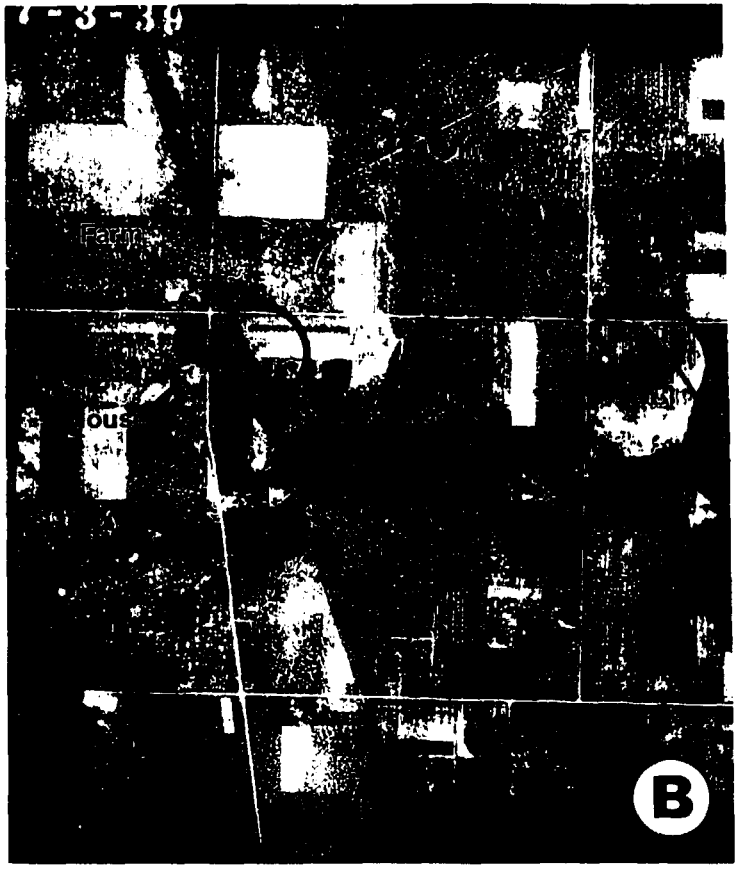
Photographs from 1939 to 1994 were analyzed to examine how the site has changed over the 55 year span that photographs are available. **Figure 5a** shows the area that is now occupied by the subdivisions in the 1939 vintage photographs. These photographs were examined because they predate development of the Hononegah Heights Subdivision, when the site was still devoted to farming activities. The quality of the photographs are the least of all the years that were examined, and a light dusting of snow, which was present when the photographs were taken, further obscures some features. Despite the grainy nature of the photographs, it is possible to see a low area, marked by an "L", to the east of a lineament. Lineaments are shown in red on the historical photographs, and dotted where inferred. It is reasonable to assume that ground and surface water would have drained to this low. A farmhouse and surrounding buildings are located south of Hononegah Road. An area circled in blue shows what is most likely a large farm. This area may be of interest for sampling, since solvents could have been used on farm vehicles. **Figure 5b** shows the suspected source area (shown by a blue circle), 2 miles to the northeast of the site, as it appeared in 1939. The area is completely rural with a farm and a house.

Figure 6 shows the site, including the area where the subdivisions were eventually located, and the suspected source areas in 1946. According to the background information construction on Hononegah Heights began in 1940, however there is little evidence from the 1946 photographs that any homes had been constructed. Two farms with outlying buildings, which are seen in the 1939 photographs, are still present in the subdivision area. The low at the river, seen on the 1939 photographs, is still present. Two new homes or farms have been added, since 1939, on either side of Hononegah Road. The quarry operations have begun by this date, and a farmhouse or office building is located near the quarry.

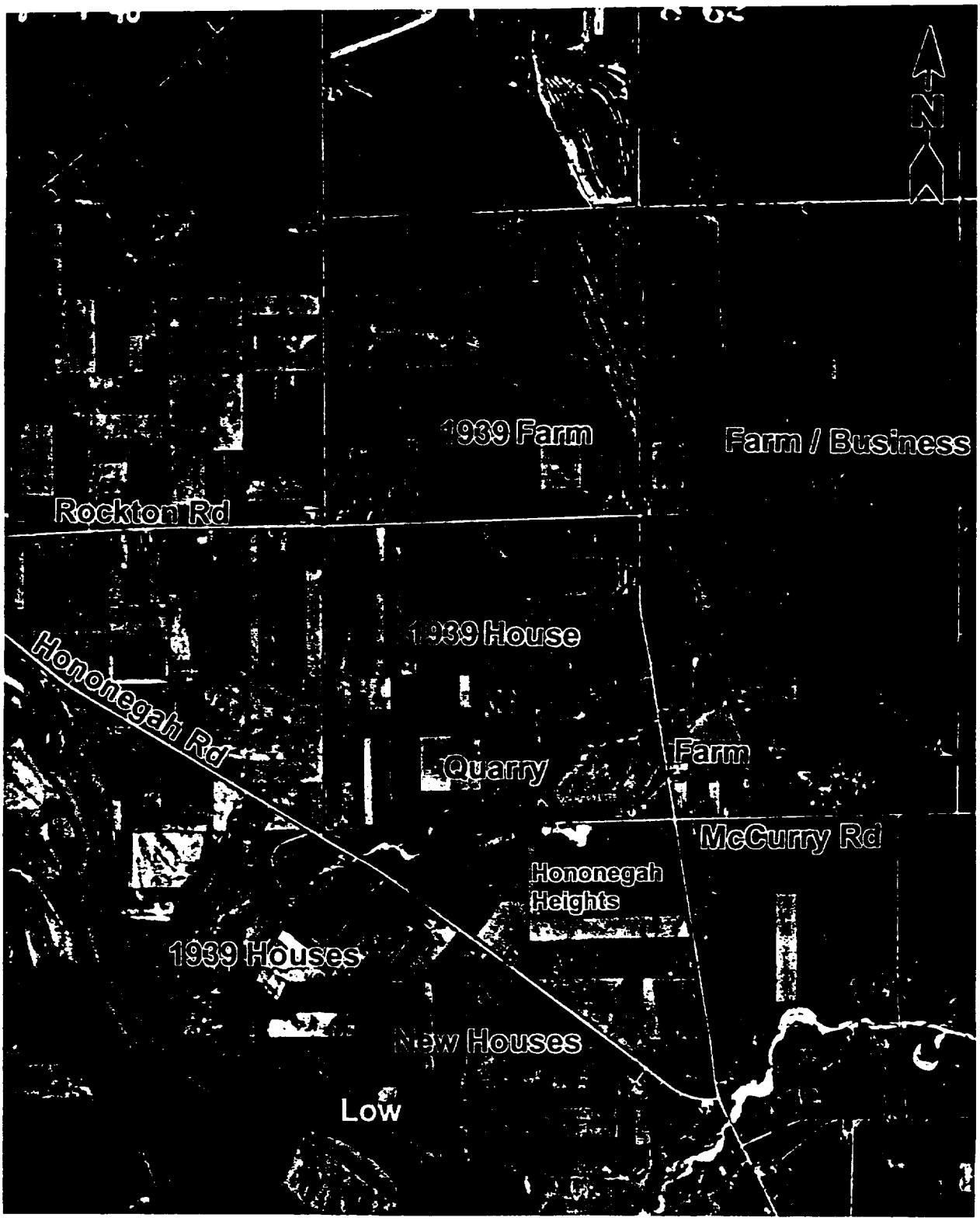
In the suspected source area, two homes or farms present in 1939 are still in existence, but a new farm or business has been added north of Rockton Road.

Figure 7a shows the subdivision area in 1970. The low by the river is still apparent, and a northeast trending lineament is prominent. The two houses present from 1939 are still in existence, as are two houses seen for the first time in the 1946 photographs. The Hononegah Heights Subdivision has clearly been developed, as has the quarry. An apparent upthrown block (labeled with a "U"), along an east-west trending fracture, is also present. The downthrown side is labeled with a "D". This upthrown block could act as a barrier to groundwater flow, and wells or piezometers should be constructed on either side of this block to determine if water levels change across the block. However, as a result of the high permeability of the sediments in the area a difference in hydraulic head across the upthrown block may not be observed.

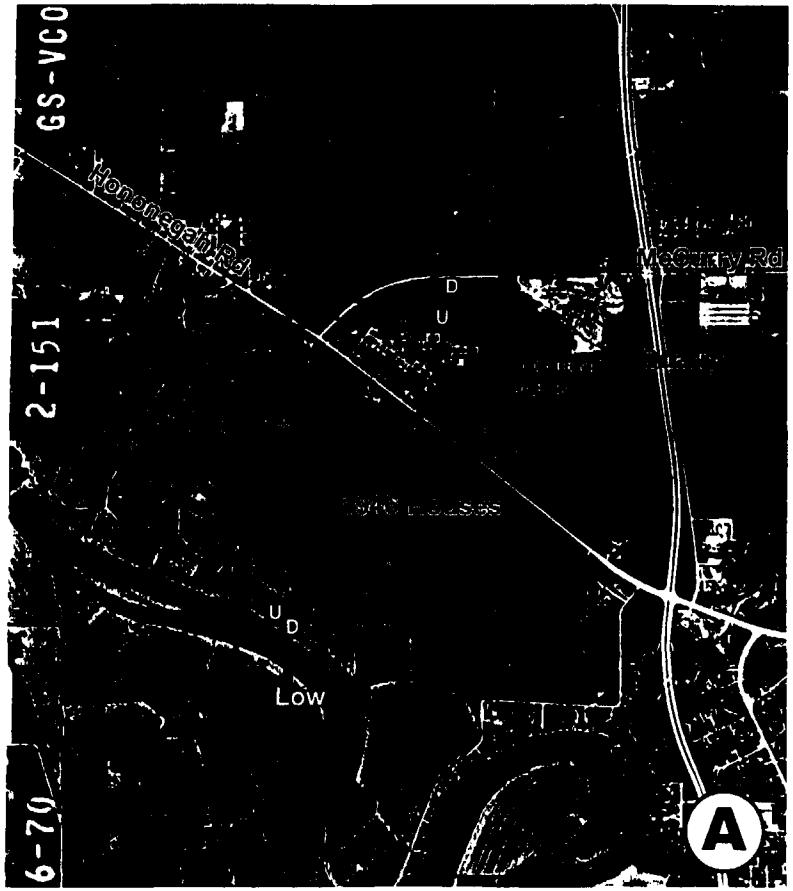
Figure 7b shows the suspected source area in the 1970 set of photographs. The two farms/houses that were located west of Route 251 in the 1939 photographs are no longer

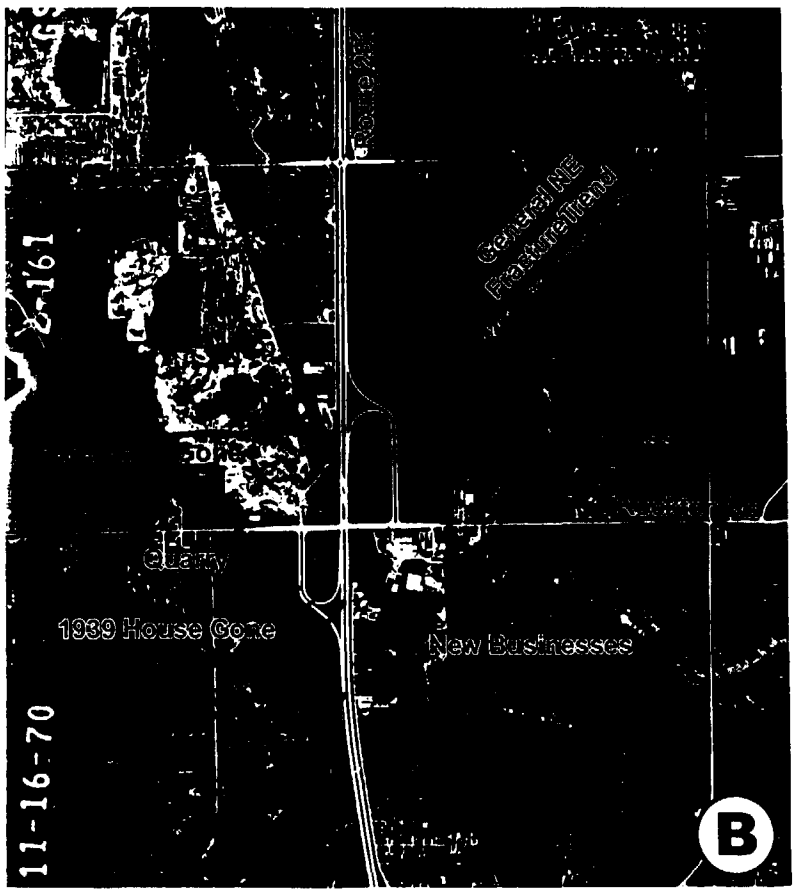


310 West 52nd Street Minneapolis, MN 55419 Tel: (612) 824-3234 Fax: (612) 825-0704	Title 1939 Historical Photographs	Reference	Figure No 5

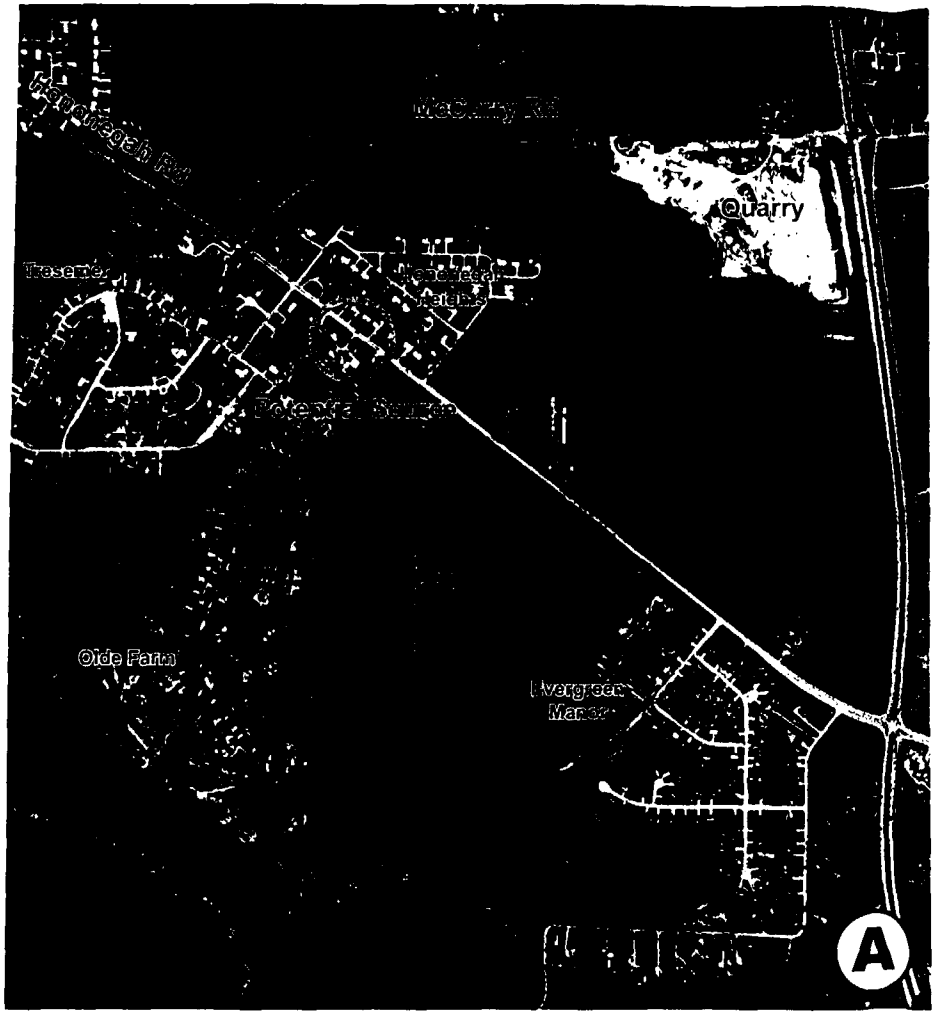


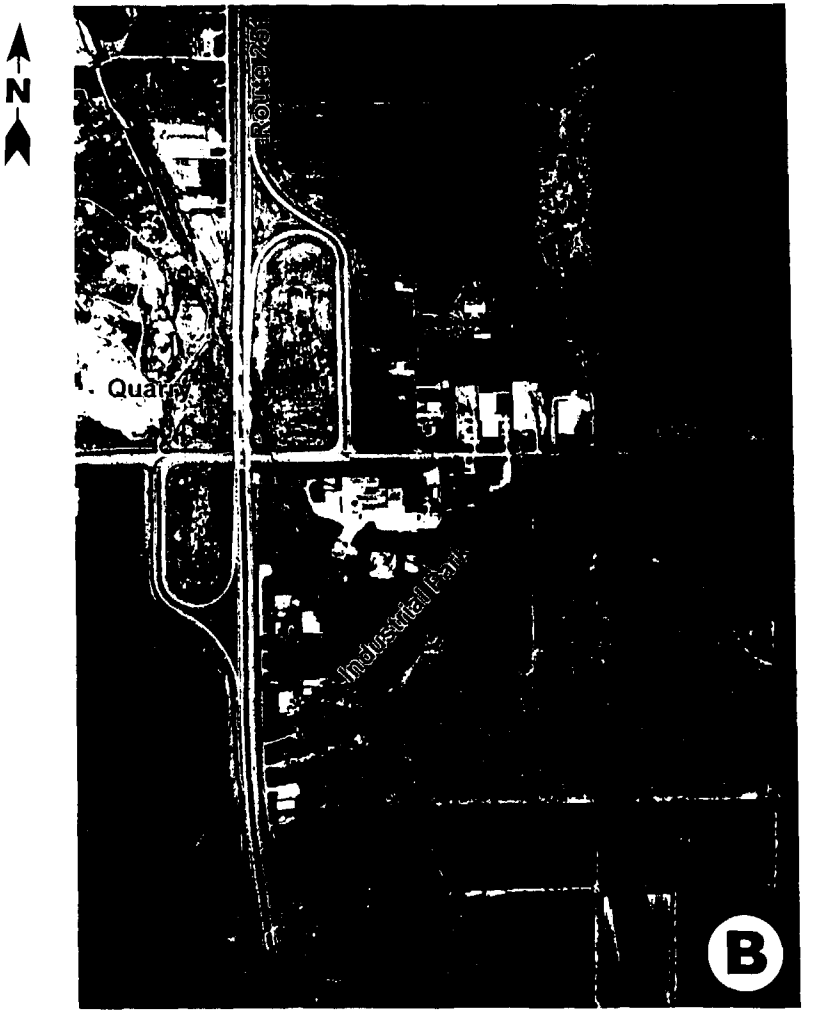
Resolution Resources, Inc. 3D Acoustic Imaging for the Environment 310 West 52nd Street Minneapolis, MN 55419 Tel. (612) 824-3234 Fax: (612) 825-0705	Title 1946 Historical Photograph	Reference	Figure No 6





310 West 52nd Street Minneapolis, MN 55419 Tel: (612) 824-3234 Fax: (612) 825-0705	Title: 1970 Historical Photographs	Reference	Figure No: 7





310 West 52nd Street Minneapolis, MN 55419 Tel (612) 824-3234 Fax (612) 825-0705	Title: 1978 Historical Photographs	Reference	Figure No: 8

Acoustic Environmental Systems, Inc. 10 Acoustic Imaging for the Environment	310 West 52nd Street Minneapolis, MN 55419 Tel (612) 824-3234 Fax (612) 825-0705	Title: 1994 Historical Photograph	Reference	Figure No: 9

there. Quarry operations have commenced. A farm to the east of Route 251 seen in 1946 is gone, and three new businesses have been constructed. A general northeast trend in lineaments, which is also observed in the dry streambed, is shown in the photographs.

Figure 8 shows the 1978 photographs. Figure 8a shows the extent of development in the subdivision area, and a potential source location from the 1939 photographs. Figure 8b shows the growth of businesses in the suspected source area east of Route 251, both south and north of Rockton Road.

Figure 9 shows the site in 1994, which is the most recent photograph that was obtained. This photograph was taken at a regional scale so it is possible to see the general north-south and east-west, and northeast-southwest and northwest-southeast, linear trends present in the area.

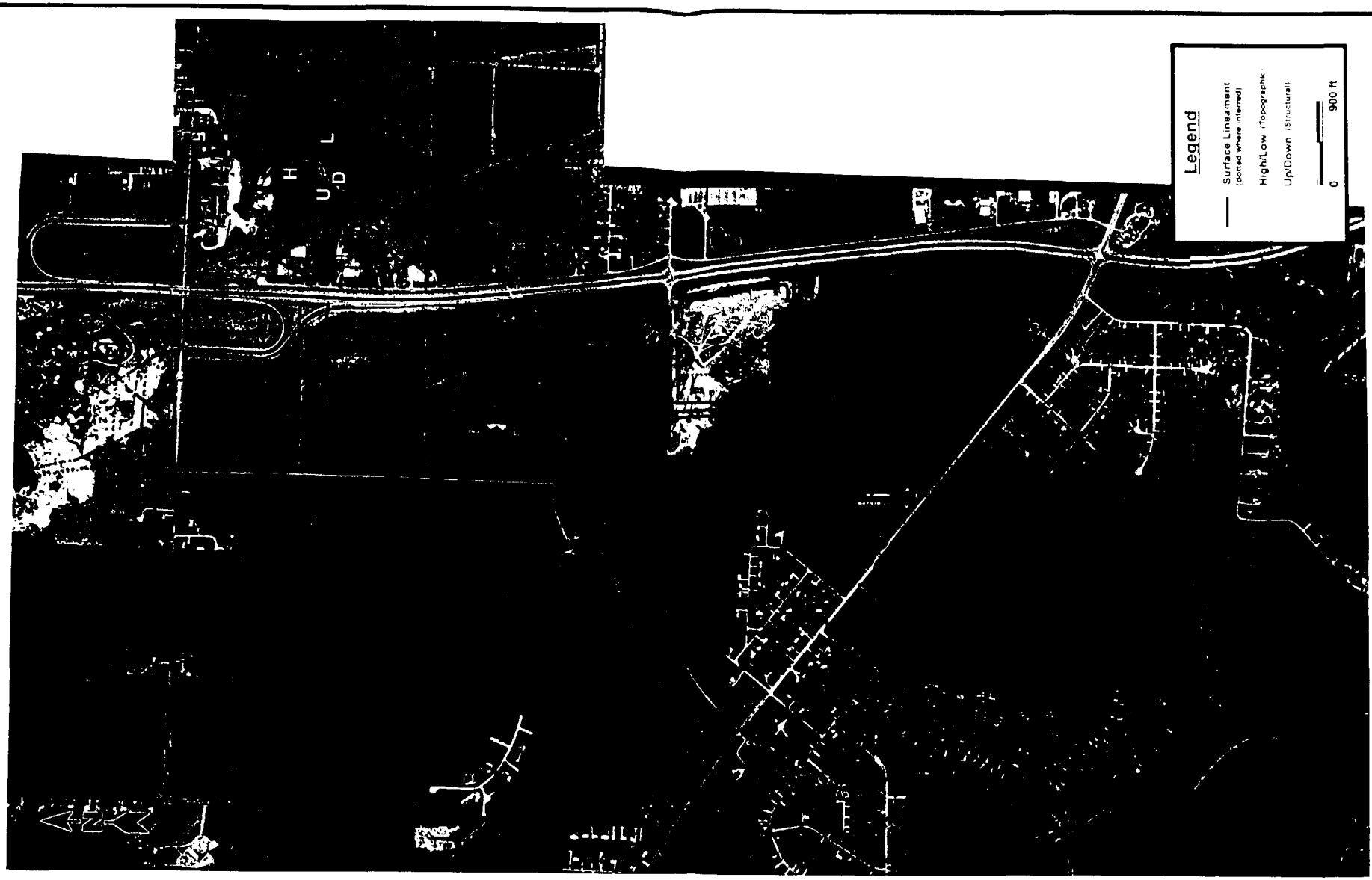
3.3 FRACTURE TRACE ANALYSIS

All of the photographs were evaluated for sun angle, seasonal variations, and greatest vertical exaggeration. The photographs from 1978 were chosen to perform a detailed fracture trace analysis, because of their scale and clarity. The uninterpreted, 1978 stereographic aerial photographs are included in **Appendix A**.

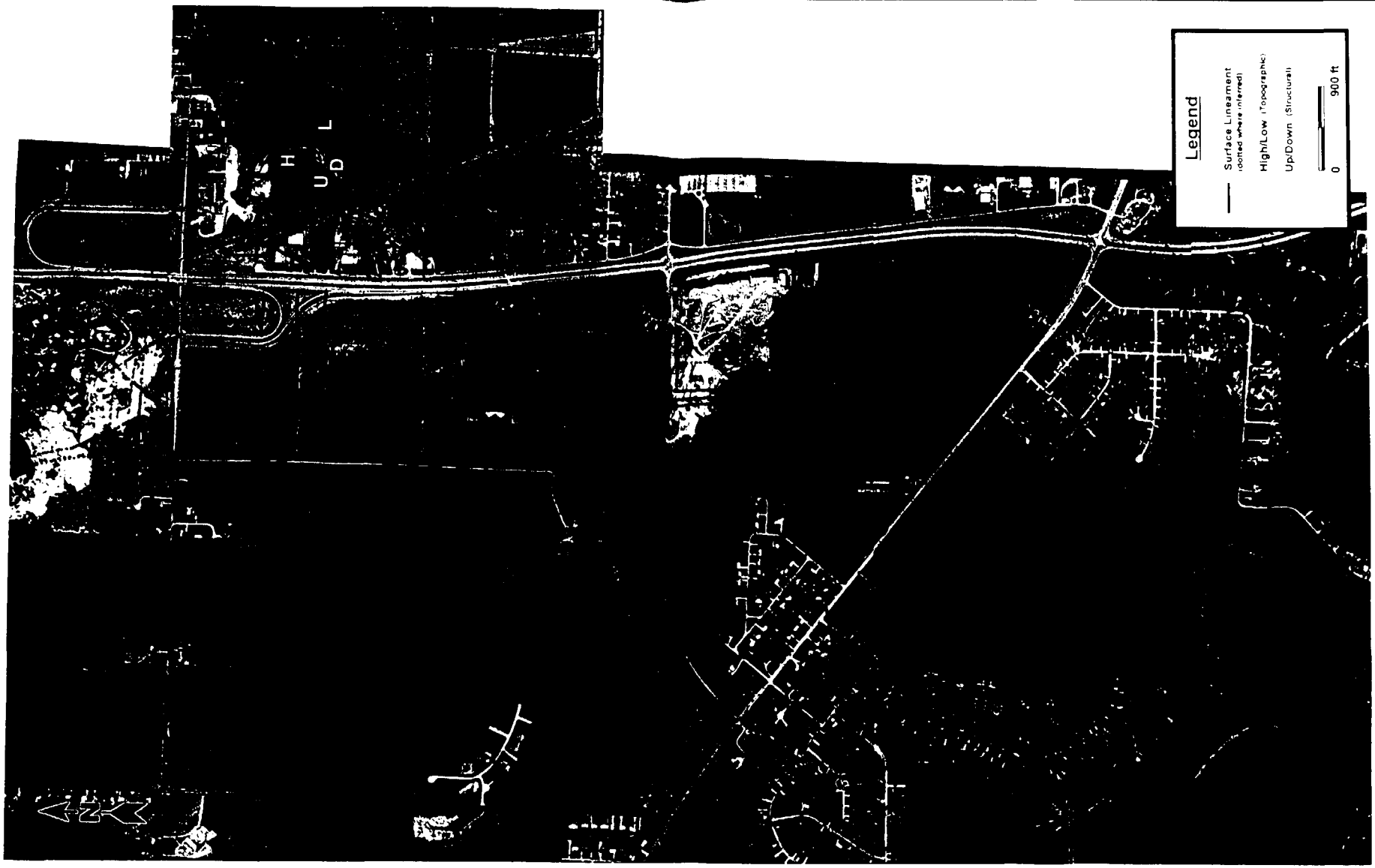
Figure 10 shows the mosaic of the detailed fracture trace analysis, which was performed on the 1978 photographs. Lineaments are shown in red, and are dotted where inferred. The fracture trace analysis shows that there are two main sets of fracture trends, a north-south/east-west set, and a northeast-northwest conjugate set. These two sets of lineaments are also seen in trends in the geomorphology. The clearest linear features can be seen in the quarry north of Rockton Road. There are many lineaments that trend northeast toward the subdivision from the industrial park. So a more permeable transport of fluids along fractures does exist. Once south of Hononegah Road the plume appears to follow north-south oriented fractures that extend ~~north~~ South to the Rock River.

Figure 11 shows the lineaments from the fracture trace analysis superimposed with the site plan. Since the examined photographs were not orthorectified to remove distortions, the fit of the photographic interpretation on the site plan cannot be exact. The position of the lineaments on the site diagram should be regarded as a close approximation.

A cursory examination of the figure shows that in the area of the subdivisions, where the plume moves in a more north-south direction south of Hononegah Road, the most prominent lineaments are also oriented north-south. In the area north and northeast of Hononegah Road the most prominent lineaments trend northeast in the same direction as the plume. As an aside, northwest trending lineaments are most prominent to the north of the dry creek bed. There is some evidence then, that the direction of the VOC plume is controlled by fractures.



310 West 52nd Street Minneapolis, MN 55419 Tel. (612) 824-1234 Fax (612) 825-0701	Title Fracture Trace Analysis: 1978 Aerial Photographs	Reference	Figure No. 10



310 West 52nd Street Minneapolis, MN 55419 Tel: (612) 824-3234 Fax: (612) 825-0705	Title Fracture Trace Analysis: 1978 Aerial Photographs	Reference	Figure No. 10

4. RECOMMENDATIONS

4.1 SAMPLE POINT LOCATIONS

It is necessary to mention that one of the limitations of aerial interpretation of fractures is plowed fields, which are in abundance at this site. It is impossible in many cases to see lineaments in freshly plowed fields. As a result, some of the sample locations are restricted in these areas.

Figure 12 shows the recommended locations for a total of 44 sample points (SP) on fractures. Locations 1-9 are at the juncture of one or more fractures or in lows in the southernmost part of the plume. Sample points 3 and 5 are in lows. It will be very important to try to place the actual sample points as close to the recommended locations as is possible, since these more permeable fracture zones are quite narrow.

SP 10 is at the juncture of a north and northeast trending fracture. Note that northeast trending Lineaments A and B to the east may coincide with the high yields necessary for public production wells, which are noted on Figure 2.

SP 11 and 13 are located along northeast trending fractures that extend toward the suspected source areas.

SP 12 and 13 are at the juncture of a north-south trending fracture and the northeast trending fractures.

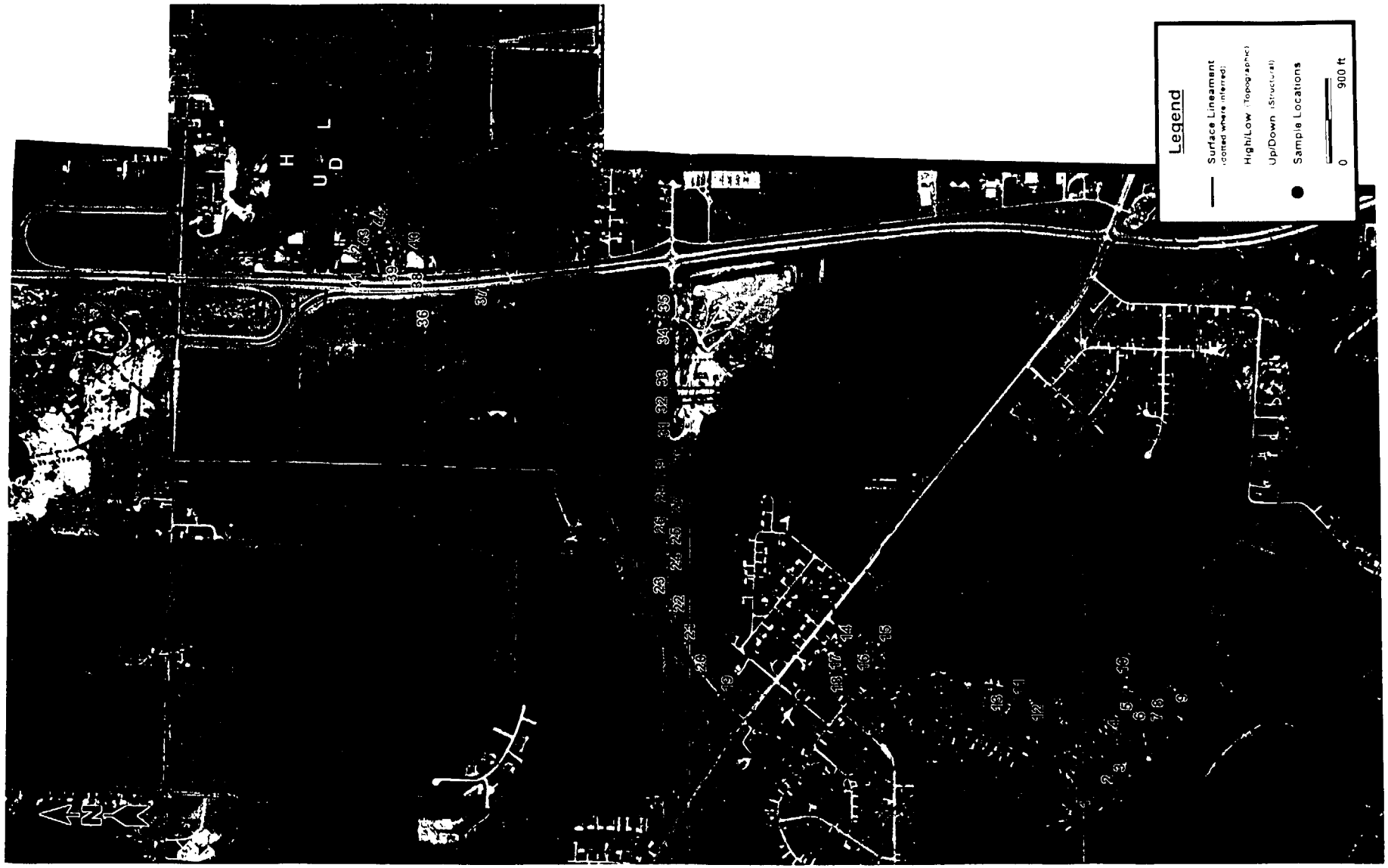
SP 14-18 are located along fractures down-gradient of the large farm, which has been identified from the 1939 photographs as a possible source.

SP 19-35 are located at fractures that cross McCurry Road.

Finally, SP 36-44 are located at fractures within the industrial park area.

4.2 HISTORICAL PHOTOGRAPHS

Table 1 shows the photographs that are available following a library search by National Aerial Photography for historical photographs. Since the source has not been absolutely identified, it may be prudent to review additional historical photographs that show the site from the 1950s to the 1980s. Enlargements of areas of interest may be required for future work.



310 West Third Street Minneapolis, MN 55415	Title: Recommended Sample Point Locations	Reference	Figure No: 12

5. DISCUSSION

The present understanding of the location of the solvent plume suggests that it is controlled by fractures. The additional sample points may further define the plume, at least to depths of 110 feet. The low levels of VOCs that have been detected make it difficult to pinpoint a source. The photographic analysis has suggested that one of the farms, present since at least 1939, could have been a possible source. Down-gradient sample locations have been recommended to explore this issue.

If businesses in the industrial park (two miles to the northeast) are indeed the responsible parties, it is very likely that the contaminants may have been transported along vertical or nearly vertical fractures, through the very permeable glacial sand and gravel deposits, and into the dolomite aquitard. In this case, VOCs may be located in pockets along the irregular dolomite surface. If this is so, then the present depth of investigation will not be sufficient to characterize the vertical extent of the plume. If it appears that VOCs, especially in the free phase, went into the groundwater, then seismic imaging will be required to define the aquitard surface and the vertical fracture conduits. This option may be discussed after the present sampling round has occurred.

Results from the next sampling event should be reviewed and recommendations should be made, based upon this data, whether a deeper investigation is required.

6. REFERENCES

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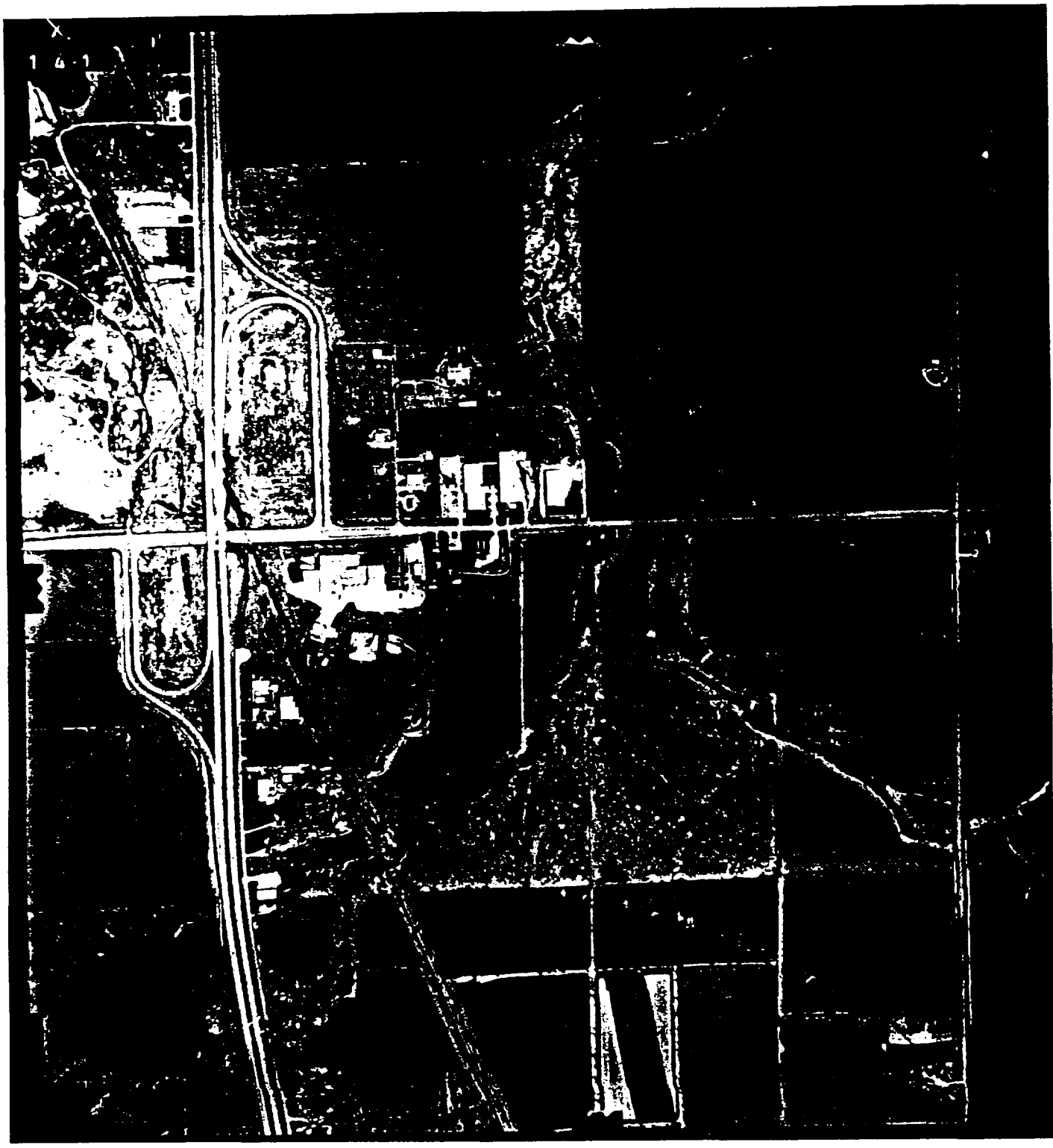
APPENDIX A

UNINTERPRETED AERIAL PHOTOGRAPHS



10 Acoustic Imaging for the Environment	310 West 52nd Street Minneapolis, MN 55419 Tel: (612) 824-3234 Fax: (612) 825-0705	Title 1978 Aerial Photograph: 1-4-1	Reference	Figure No A1

310 West 52nd Street
Minneapolis MN 55419
Tel (612) 824-3234
Fax (612) 825-0705

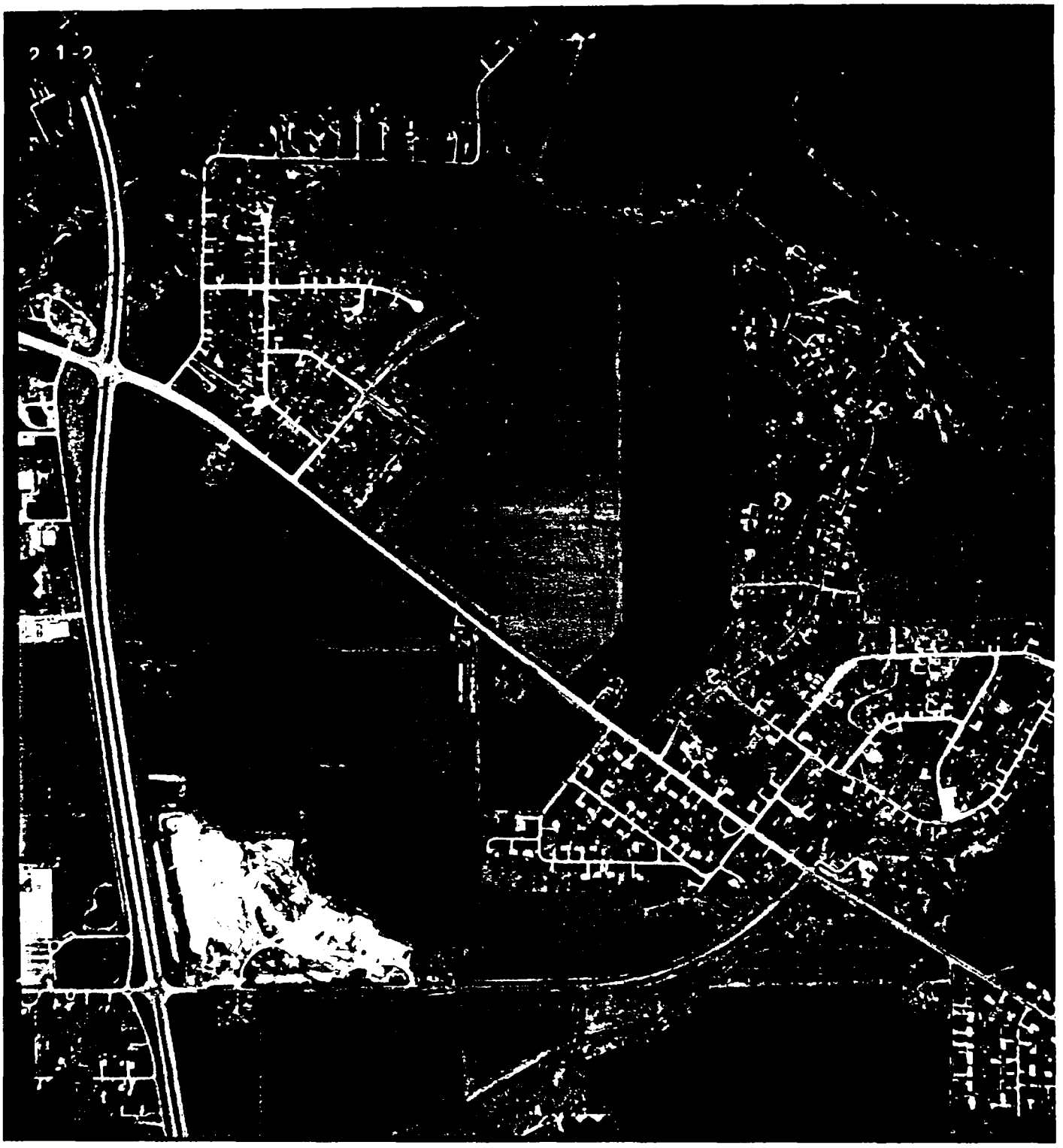
Title

1978 Aerial Photograph: 1-4-2

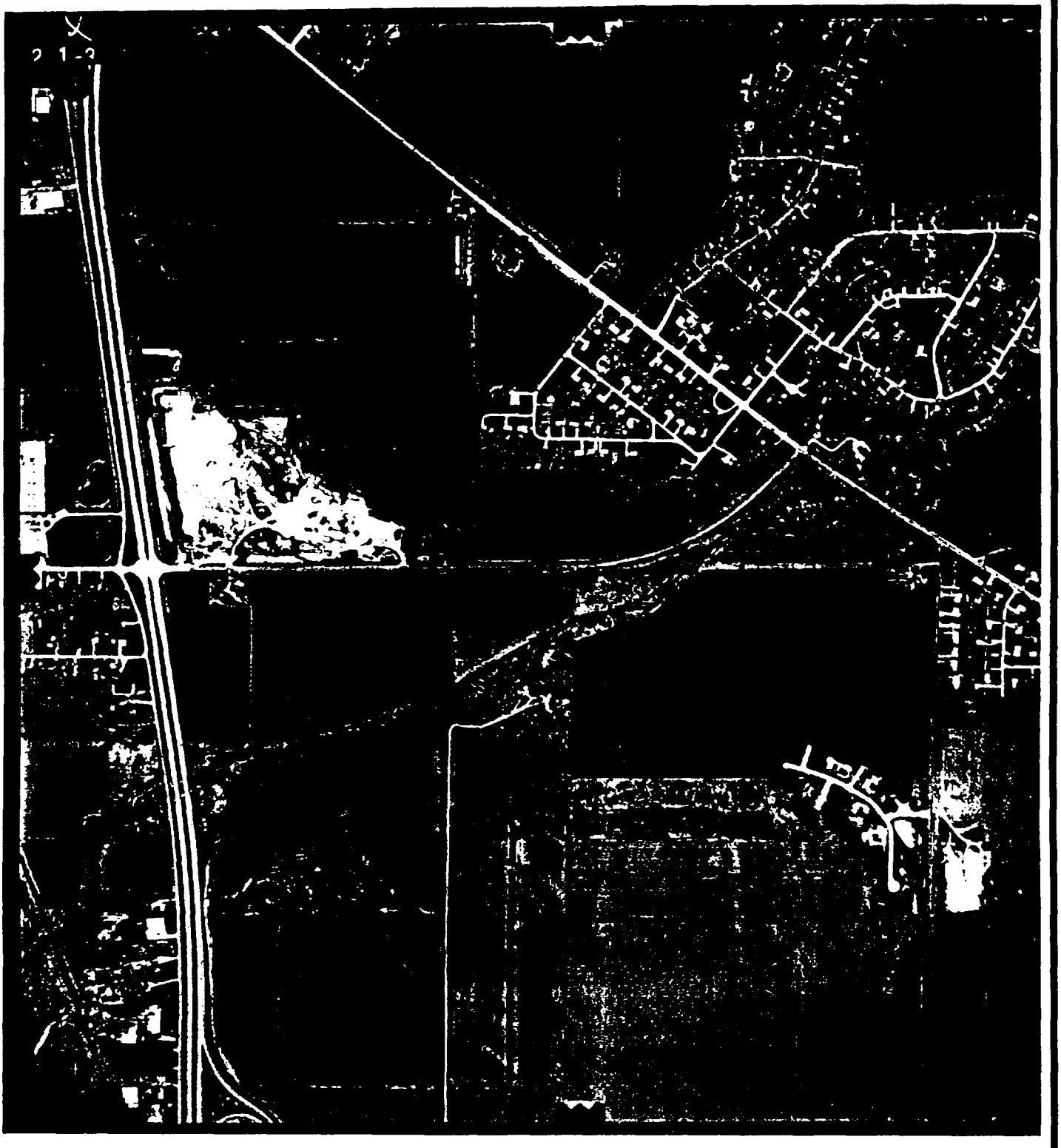
Figure No.

A2

Resolution Resources, Inc. 3D Acoustic Imaging For the Environment	310 West 52nd Street Minneapolis, MN 55419 Tel: (612) 824-3234 Fax: (612) 825-0705	Title 1978 Aerial Photograph: 2-1-1	Reference	Figure No. A3



[illegible] Acoustic Imaging for the Environment	310 West 52nd Street Minneapolis, MN 55419 Tel: (612) 824-3234 Fax: (612) 825-0705	Title 1978 Aerial Photograph: 2-1-2	Reference	Figure No. A4



3D Acoustic Imaging for the Environment 310 West 52nd Street Minneapolis, MN 55419 Tel: (612) 824-3234 Fax: (612) 825-0705	Title 1978 Aerial Photograph: 2-1-3	Reference	Figure No. A5

Environmental Resources Corp. 3D Acoustic Imaging for the Environment	310 West 52nd Street Minneapolis, MN 55419 Tel (612) 824-3234 Fax (612) 825-0705	Title 1978 Aerial Photograph: 2-1-4	Reference	Figure No A6

Spectrum Resources, Inc. 3D Acoustic Imaging for the Environment	310 West 52nd Street Minneapolis, MN 55419 Tel (612) 824-3234 Fax (612) 825-0705	Title 1978 Aerial Photograph: 2-1-5	Reference	Figure No A7